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DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION

Job Performance Report

Project F-71-R-12

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 6 (IF)-b.	Region 6 (Idaho Falls) Lowland Lakes Investigations
Job No. 6 (IF)-c^1.	Region 6 (Idaho Falls) Rivers and Streams Investigations
Job No. 6 (IF)-c^2.	Region 6 (Idaho Falls) Rivers and Streams Investigations -- Big Lost and Little Lost Rivers, and Birch and Medicine Lodge Creeks Survey
Job No. 6 (IF)-d.	Region 6 (Idaho Falls) Technical Guidance

By

Chip Corsi, Regional Fisheries Biologist
Steve Elle, Regional Fisheries Manager

May 1989

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JOB PERFORMANCE REPORT

State of: Idaho **Name:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-12

Job. No.: 6 (IF)-b[l] **Title:** Region 6 (Idaho Falls) Lakes and Reservoirs Investigations

Period Covered: July 1, 1987 to June 30, 1988

ABSTRACT

Limnological sampling at Ririe Reservoir indicated zooplankton densities peaked in late May to early July. Cladocerans showed a second peak in September, while copepods had a secondary peak during July. Zooplankton densities in 1987 were two to four times lower compared with 1982 data. The plankton peaks in 1987 were a month earlier than 1982, which may be due to **a** lack of runoff and warmer weather conditions in 1987. Surface temperatures exceeded 20°C only at Station 5 in July. Temperatures were not expected to limit trout use of the epilimnion after Ririe Reservoir stratified.

Forage fish abundance sampling was initiated in 1987 in Ririe Reservoir in an attempt to assess smallmouth bass impacts on forage availability. Early season sampling showed redside shiners and longnose dace at six sample stations. However, fall sampling failed to capture any forage fish, and methodologies will need to be reevaluated in 1988.

Gill net sampling in Ririe and Island Park reservoirs indicated an increase in Utah chubs and Utah suckers. To date, the increases of these nongame species has not been associated with a notable decline in game fish in either reservoir. Fall gill and trap net samples in the Willow Creek arm of Ririe Reservoir indicated a large number of age 3+ or older cutthroat which probably utilize the reservoir as an overwinter area.

Creel checks from Ririe Reservoir showed anglers averaged a harvest rate of 0.75 fish per hour, which meets the management goal. Rainbow trout accounted for 78% of the harvest. Smallmouth bass were captured by some anglers between the dam and Meadow Creek arm, although most were smaller than the 300 mm minimum size and were released.

Creel checks at Island Park Reservoir indicated catch rates of 0.90 fish per hour during the summer and greater than 1.0 fish per hour during the winter ice fishery. Large rainbows, possibly from high fingerling plants in 1985, were common in the reservoir fishery.

We collected 184 mature black crappie at Paddock Reservoir April 28 and 29 for release in Mud Lake. We collected 125 largemouth bass and 163 bluegill from Twin Lakes August 5 and 6. We released 100 bass and 100 bluegill in Roberts Gravel Pond. After developing a cooperative agreement with a Menan rancher, we released 25 bass and 63 bluegill to initiate a brood source of these two species for future stocking.

Authors:

Chip Corsi
Regional Fisheries Biologist

Steve Elle
Regional Fisheries Manager

OBJECTIVES

1. To evaluate limnological parameters at Ririe Reservoir for comparison with 1982 data.
2. To conduct Ririe Reservoir forage fish sampling to set baseline data for assessment of smallmouth bass predation on forage base.
3. To conduct gill net sampling to assess relative abundance of fish species in Ririe and Island Park reservoirs.
4. To collect warmwater fish species for introductions into Mud Lake, Roberts Gravel Pit and Boyle's private pond.

RECOMMENDATIONS

1. Mark strains of rainbow trout fingerlings for release in Ririe Reservoir in 1988. Conduct a full creel census in 1989 to assess strain evaluation and to further evaluate fingerling return to creel as affected by declining zooplankton.
2. Assess forage fish sampling methodology and revise as necessary to determine availability to smallmouth bass.
3. Continue to make warmwater fish releases into Mud Lake, Roberts Gravel Pond and other isolated waters as broodstock for future fisheries in those waters.

TECHNIQUES USED

Ririe Reservoir

Limnology

A Yellow Springs Instrument Company temperature-conductivity meter (Model 33) and an oxygen meter (Model 57) were used to measure water quality profiles. Measurements were recorded at 1 m depth intervals from surface down to 15 m, or to within 1 m of the bottom. A standard 20 cm Secchi disc was used to measure water transparency. Plankton samples were collected using a Wisconsin-style plankton net with 80 micron mesh size for direct comparison with samples collected in prior years. We made vertical tows of 10 m at the five sampling stations selected by Jeppson (Jeppson and Ball 1977) (Figure 1). Limnological samples were collected biweekly from May 21 through November 3, 1987.

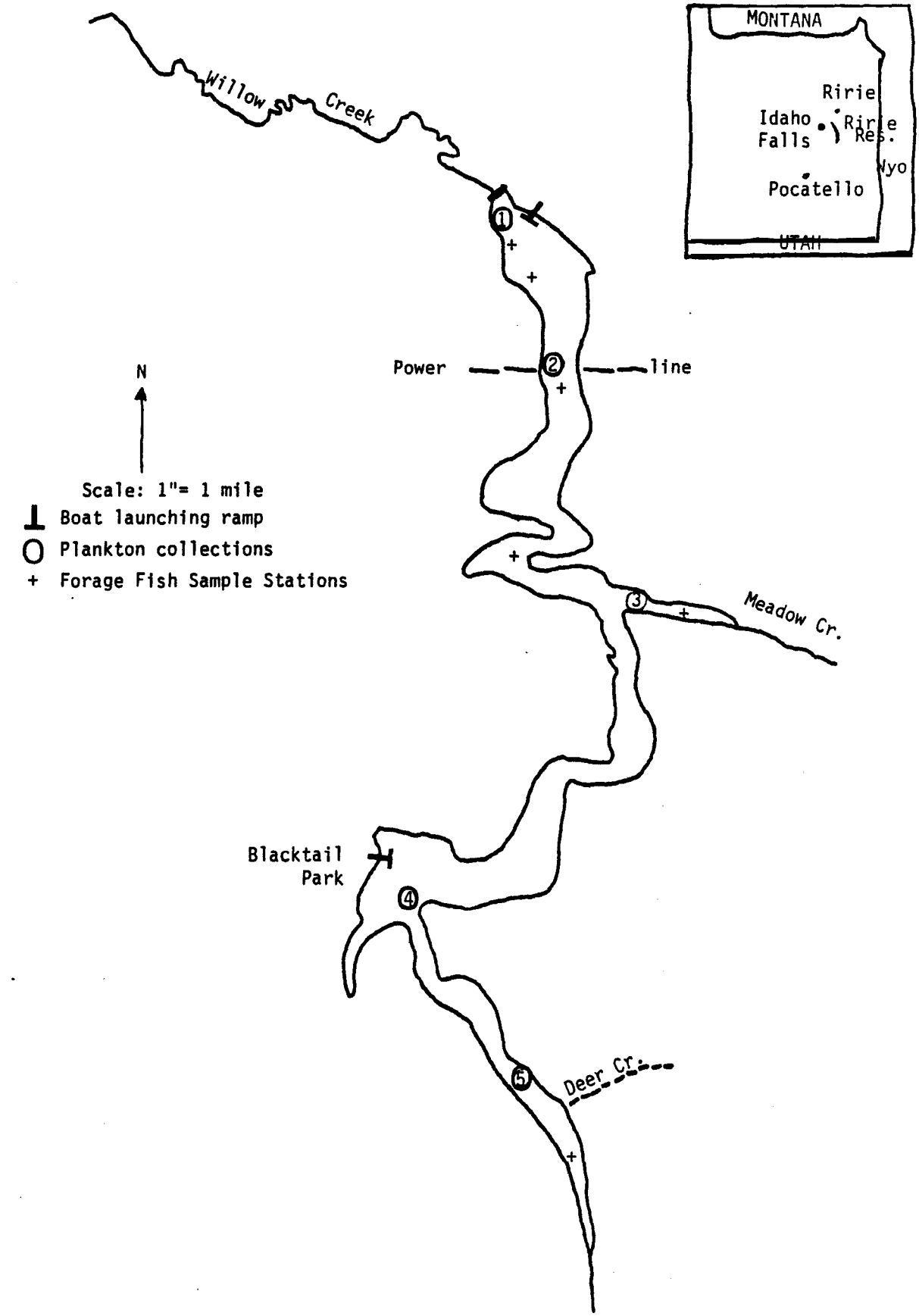


Figure 1. Map of Ririe Reservoir with limnological and forage fish sample sites.

Forage Fish Index

Gee's minnow traps, lined with window screen, were used to assess forage fish abundance at six locations on Ririe Reservoir (Figure 1). An experimental design of three floating minnow traps and three traps set on the bottom contour, each 10 m apart, was selected to sample forage fish which smallmouth bass will likely utilize. The minnow traps were fished one night at each station during the period May 27 to June 12. Mid- and late-season minnow trapping was attempted July 30 to August 6 and October 21 to 23, respectively.

Species Composition

Experimental gill nets were used to assess relative abundance of game and nongame fish species. Three horizontal, experimental mesh gill nets were set May 5 and pulled May 6, 1988. Fall sampling (November 3 and 4) was conducted in the Willow Creek arm with a trap net and one horizontal gill net to assess cutthroat population structure.

Creel Census

Nonstratified angler contacts were made periodically during summer 1987 to determine species composition, catch rates and size of fish in the fishery.

Island Park Reservoir

Three experimental mesh gill nets were set overnight May 19 to 20 in Island Park Reservoir. Horizontal gill net sets were made in the west end fingers and opposite I. P. Bill's Island as in past years. The vertical gill net set located south of I. P. Bill's Island was dropped because of poor sampling efficiency, and a horizontal gill net set was added opposite the boat launch near the dam.

Warmwater Fish Introductions

Project personnel traveled to Paddock Reservoir April 28 and 29 where Region 3 personnel assisted in collecting black crappie for release in Mud Lake. We used trap nets, electrofishing gear and hook-and-line methods to collect crappie. Region 5 personnel collected largemouth bass and bluegill August 4 and 6 for release in Boyle's Gravel Pond and Roberts Gravel Pond on August 7.

FINDINGS

Ririe Reservoir

Limnology

Zooplankton densities peaked in late May and early June throughout Ririe Reservoir (Figure 2). Cladocerans exhibited a second peak during September, while copepods had a secondary peak during July. Estimated plankton densities were lower in 1987 than in 1982, and only at Station 5 did cladocerans exceed 100 per liter. In 1982, Daphnia densities peaked at over 400 per liter during July. The lower densities of zooplankters may be a result of reduced productivity of the reservoir, which is in its 12th year. Unfavorable conditions due to the low runoff from Willow Creek may also be responsible. The earlier timing of the blooms during 1987 are probably a direct result of lower runoff and water temperatures, which warmed earlier than in 1982.

Light attenuation typically showed an increase at all stations except No. 5 from late June to early July and remained high throughout the summer (Figure 2). At Station 5 (the uppermost station), transparency peaked in mid-June and declined thereafter. Higher transparencies in 1987 versus 1982 were partially due to the lack of a prolonged, high water runoff period.

Surface temperatures had already exceeded 10°C by the time sampling was started in late May and reached 20°C by July 1. The drought conditions and subsequent lack of runoff undoubtedly resulted in the early warming of the reservoir. These conditions probably favored smallmouth bass reproduction and YOY growth.

Limnological samples in 1987 indicate a decline in zooplankton densities present throughout the summer when compared with 1982 densities in Ririe Reservoir. Reductions in zooplankton densities were anticipated as Ririe Reservoir "ages" and the productivity of the system declines. During 1986, return to creel of fingerling rainbow and coho dropped significantly (Elle and Corsi 1987) compared to 1982 (Ball et al. 1982). The increase in abundance of Utah chubs and Utah suckers may compound the problem of declining zooplankton densities in relation to survival of fingerling salmonids. We are scheduled to mark fingerling trout in 1988 for a strain evaluation study. We will complete a full creel census again in 1989. If in 1989 fingerling returns to creel are still at 1987 levels, we will drop fingerling production emphasis for Ririe Reservoir management.

Forage Fish Index

Redside shiners and dace appeared to be present in high numbers during the initial sampling period at Ririe Reservoir (Table 1). Redside shiners were almost entirely captured near the surface, while dace were present at varying depths in association with substrate as well as the surface. Sculpin, as expected, were only captured along the bottom.

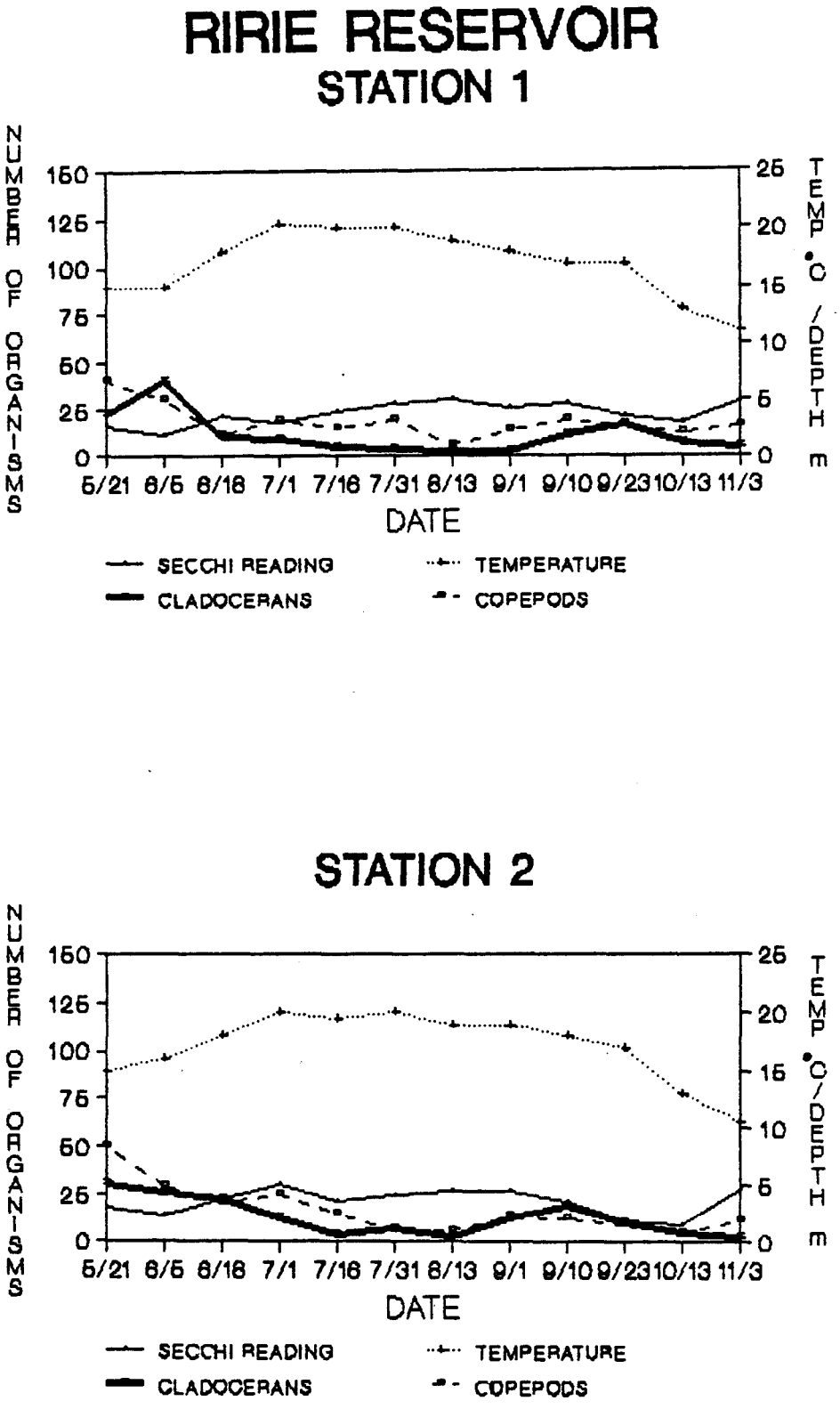
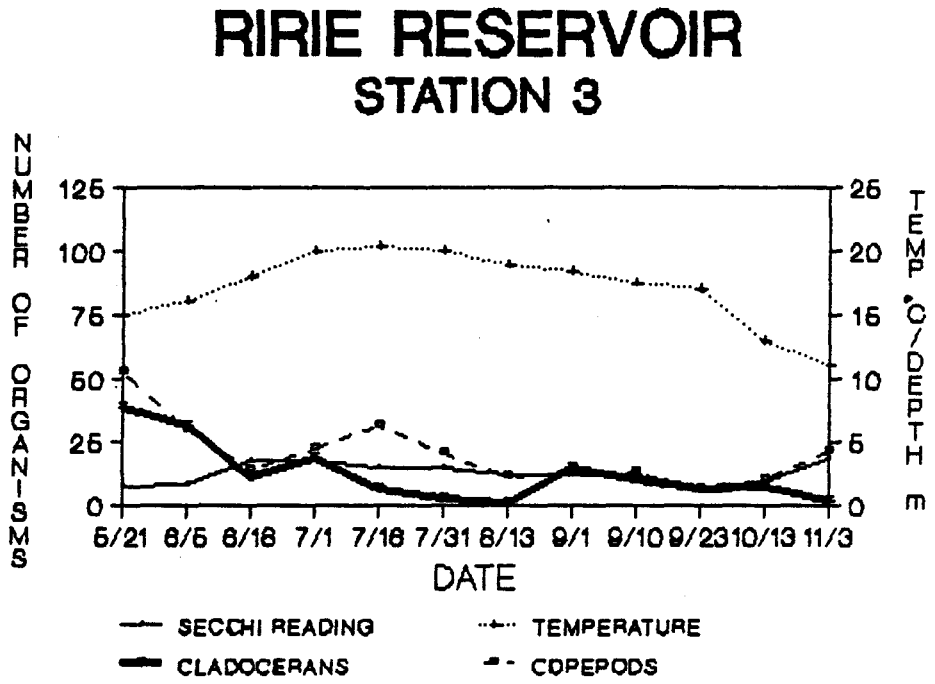


Figure 2. Limnological characteristics of Ririe Reservoir, 1987.



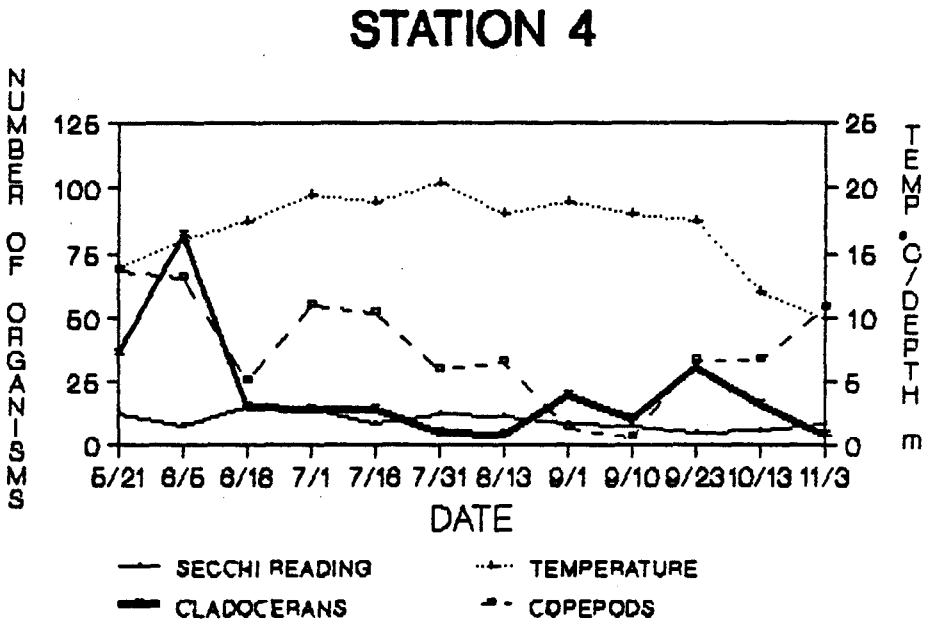


Figure 2. Continued.

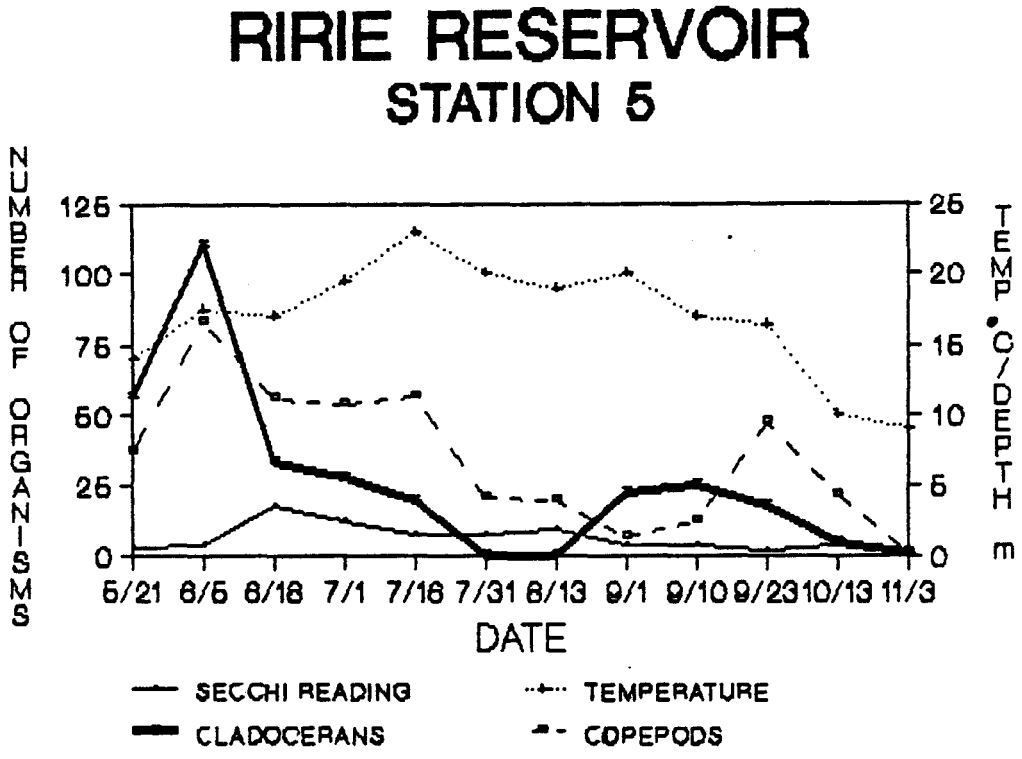


Figure 2. Continued.

Table 1. Species composition and numbers of forage fish captured in minnow traps during the late spring sample in Ririe Reservoir, 1987.

Station	Date	Trap position	Species: Redside shiners	Dace	Smallmouth bass	Sculpin
1	5/27	surface[a]	21	0	0	0
		bottom[b]	1	22	0	0
2	5/28	surface	2	0	1	0
		bottom	2	1	0	0
3	5/29	surface	35	53	0	0
		bottom	1	1	0	0
4	6/2	surface	88	27	0	0
		bottom	0	16	0	3
5	6/5	surface	62	8	0	0
		bottom	1	4	0	0
6	6/12	surface	14	0	0	0
		bottom	0	1	0	0

[a]Surface includes the total number of fish captured in 3 traps set on the surface.
[b]Bottom includes the total number of fish captured in 3 traps set on the bottom.

Sampling with the minnow traps during midsummer (7/30-8/6) and fall (10/21) failed to capture any fish. We did, however, observe a number of redside shiners in the trap net set in the Willow Creek arm during November. Scott and Grossman (1973) indicate that redside shiners may perform seasonal migrations. Perhaps, fish captured in the late fall are shiners which have moved downstream from Willow Creek. Additional sampling in 1988 should help determine if forage species are being impacted by smallmouth bass. Sampling in 1988 may require a different design to collect fish in mid- and late-summer periods.

Species Composition

Based on gill net sampling, Utah chub and Utah sucker populations appear to be increasing in Ririe Reservoir (Table 2).

Numbers of rainbow trout, cutthroat trout, brown trout and coho salmon captured during spring sampling were similar to those observed in the horizontal sets in the spring of 1986, although fish tended to be more evenly distributed in 1987. Smallmouth bass were captured by netting for the first time in 1987 and were found throughout the reservoir during the spring sampling. The bass were all about 300 to 350 mm long and were likely survivors from our releases from 1984 through 1986.

Fall netting in the Willow Creek arm provided further evidence that numbers of age 3+ cutthroat trout in the Willow Creek system are low. All of the cutthroat trout captured were larger than 300 mm (range 310 to 450 mm). Based on scale samples (Corsi 1984), cutthroat trout in that size range are probably age 4+ to 6+. All of the brown trout captured were mature fish in excess of 550 mm (range 575 mm to 672 mm) and were in spawning or prespawning condition. Comparison with the fall gillnetting in 1984 (Corsi 1986) shows a decline in cutthroat and an increase in brown trout and rainbow trout from 1984 (Table 3). Numbers of suckers were similar, while chubs increased. Trapnetting in the fall captured primarily rainbow trout and nongame species (Table 4). Based on the 1987 comparison of gillnetting and trapnetting, it does not appear trap nets can be used in place of gill nets to sample trout populations. Trap nets are effective in sampling redside shiners, however, and may be valuable for assessing the impacts of smallmouth bass on the forage base.

Ririe Reservoir continues to provide overwintering habitat for large cutthroat trout and is also producing a number of trophy-sized brown trout. Along with the mature brown trout captured in the gill nets, anglers reported catching several brown trout exceeding 2.3 kg during the fishing season. The increased numbers of nongame fish may be providing additional forage for the larger trout and should not be considered a problem unless catch rates of game fish decline.

Creel Checks

During the 1987 fishing season, we interviewed 590 anglers who had fished a total of 1,282 hours on Ririe Reservoir. A total of 998 game fish were caught and 960 harvested, for a catch rate of 0.78 fish per hour and a

Table 2. Numbers of fish captured in spring gillnetting surveys (one net night per station), Ripie Reservoir, 1983 to 1986.

Location	Year	Species							
		WRB	WCT	BRN	CO	US	UC	RSS	SMB
Across from Juniper	1983	14	1	1	0	52	24	0	0
Vertical	1984	0	0	1	0	14	0	0	0
	1985	0	0	0	0	85	0	0	0
	1986	0	0	0	0	7	0	0	0
	1987	Discontinued							
Willow Creek Arm	1984	0	0	0	0	23	5	0	0
Horizontal	1985	9	13	0	0	26	86	1	0
	1986	61	15	0	1	60	126	1	0
	1987	32	7	0	1	262	242	3	1
Meadow Creek Arm	1984	2	5	0		16	3	0	
Horizontal	1985	0	2	2	0	1	73	0	0
	1986	5	6	2	0	4	101	0	0
	1987	14	7	0	3	49	246	0	6
Dam	1988	1	0	0	10	0	5	0	0
Horizontal	1986	17	6	1	1	64	81	0	1

Table 3. Comparison of November gill net catches from the Willow Creek arm of Ririe Reservoir. Data are for one net night each year.

Date	Species						
	WCT <300 mm	WCT >300 mm	BRN	HRB	FRB	UC	US
11/16/84	18	9	1	1	0	1	13
11/4/87	0	9	6	9	8	17	10

Table 4. Comparison of numbers of fish, by species, captured by trapnetting and gillnetting in the Willow Creek arm of Ririe Reservoir, November 4, 1987.

Method	Species								
	WCT	FRB	HRB	BRN	CO	UC	US	RSS	Sculpin
Trap net	0	12	4	0	1	6	17	11	1
Gill net	9	8	9	6	0	17	10	0	0

harvest rate of 0.75 fish per hour. Rainbow trout accounted for 78% of the harvest followed by coho salmon (19X), cutthroat trout (2%), brown trout (<1%) and smallmouth bass (<1%).

Mean lengths of game fish in the creel were similar to those observed in 1986, with the exception of brown trout which were considerably higher (Table 5). The mean length of cutthroat trout in the creel was the lowest that has been recorded and is indicative of a higher percentage of juvenile fish in the creel. The two smallmouth bass checked measured 330 mm long.

Catch rates at Ririe Reservoir continue to meet or exceed management goals (0.6 fish per hour) (Table 6). Average sizes of rainbow trout and coho salmon have not declined; thus, the fishery is as good as, or better than, it has been in previous years. The harvest of juvenile cutthroat trout is of concern because those fish represent future spawning stock for the Willow Creek system. Drought conditions may have resulted in reduced wintering habitat in Willow Creek and caused more juvenile fish to use the reservoir as a wintering area, making them more available to the reservoir fishery.

Island Park Reservoir

Despite the fact that sampling sites have not always been consistent from year to year, there appears to be a trend toward increasing numbers of Utah chubs and Utah suckers since the 1979 rotenone treatment (Table 7). Similar trends have been observed prior to the 1966 and 1979 eradication programs. Rising proportions of nongame fish in the gill net catch are probably reflective of increasing numbers but should not be interpreted to mean that fishing success for game fish has declined. Prior to the fall 1966 treatment, catch rates at Island Park Reservoir were the highest on record for a summer fishery (.90 fish per hour). Anglers reported high catch rates during the summer months in 1987, and observed catch rates during the winter fishery exceeded 1.0 fish per hour in 1987 and 1988. Continued monitoring of nongame populations and angler success should be a part of future work plans at Island Park Reservoir to determine if nongame populations have any effect on sport fishing.

Net sampling does not appear to be a good tool for evaluating relative abundance of salmonids. Angler interviews during 1986 and 1987 showed an improved catch rate of rainbow trout and kokanee salmon in 1987, which was not documented in the gill net sampling.

Warmwater Fish Introductions

Region 6 and Region 3 personnel collected 184 black crappie during April 28 and 29, 1987, at Paddock Reservoir. The crappie were collected prior to spawning and were generally 180 to 275 mm in length. Collection methods of trap nets and night electrofishing were largely unsuccessful.

Table 5. Mean total length (mm) of fish harvested from Ririe Reservoir, 1977 through 1987.

	Species				
Year	Rainbow trout	Cutthroat trout	Brown trout	Coho salmon	Smallmouth bass
1977	267	323	320	236	
1978	277	325	338	251	
1979	292	348	305	284	
1982	287	358	315	251	
1986	264	303	399	259	
1987	276	294	555	284	330

Table 6. Catch rates and percent composition of creeled fish from Ririe Reservoir, 1977 through 1987.

		Species composition (%)				
Year	Catch rate	WRB	WCT	BRN	CO	SMB
1977	0.68	76	11	12	1	
1978	0.58	59	16	2	23	
1979	0.64	75	5	<1	19	
1982	0.58	71	1	<1	28	
1986	0.71	78	2	<1	19	<1
1987	0.78	78	2	<1	19	<1

Table 7. Catch per night per 10 m of experimental gill net set in Island Park Reservoir since 1960 during the spring sampling period.

	Species composition									
	Game fish							Nongame fish		
Date	WRB	KOK	CO	BRK	WCT	WF	Total	UC	US	Total
5/60[a]	2.4	0.6	0	0.1	0	0	3.1	0.2	0	0.2
5/61	4.7	1.2	0	0	0.1	0	6.0	1.0	0.2	1.2
5/63	2.8	3.4	0	1.2	<0.1	0	7.4	9.2	0	9.2
5/64	2.5	4.3	0	1.8	0.5	0	9.2	29.7	<0.1	29.7
5/65	1.9	0.2	0	0.6	<0.1	0	2.8	63.0	0.5	63.5
4-5/66	1.3	0.6	0	0.6	0	0	2.5	10.2	0.3	10.5
5/71[a]	13.9	0.5	1.8	2.4	0	0.3	18.9	2.6	0	2.6
4/72	17.1	23.4	18.6	1.6	0	0	60.6	24.7	0.5	25.2
6/73	5.5	1.6	1.3	1.8	0	0	10.2	5.5	0.8	6.3
6/76	1.4	0	1.0	0.4	0	0	2.9	17.9	17.6	35.5
6/78	1.3	0	0	0	0	1.0	2.3	22.8	21.6	44.4
5/83[a]	1.3	0	1.0	0.3	0	0.6	3.2	8.4	0.8	9.2
5/84	3.0	0	1.1	0.8	0	0.6	5.5	5.5	1.5	7.0
5/86	6.2	0	0.8	0.2	0.2	1.0	8.4	15.0	15.0	29.9
5/87[b]	1.5	0.5	0.1	0.1	0	1.6	3.1	48.2	40.8	89.0

[a]Reservoir chemically treated to eradicate fish during the fall of 1958, 1966 and 1979.

[b]One net partially destroyed due to snagging; not all fish were recovered.

Collection efforts were likely too far in advance of spawning time for fish to have been concentrated in the near shore areas. Hook-and-line collection was the most effective method, resulting in over 80 crappie in less than two hours for three fishermen. The crappie were transported to Mud Lake April 29. We released them at the north boat launch at midnight.

Region 5 personnel collected 125 largemouth bass and 163 bluegill in Twin Lakes on August 5 and 6, 1988 using electrofishing methods. We released 100 bass and 100 bluegill in Roberts Gravel Pond and 25 bass and 63 bluegill in Boyle's Gravel Pond on August 7. The fish released into Boyle's Pond are seed stock in an attempt to establish a source of bass and bluegill for future relocations to Region 6 waters. The Department entered an agreement with Boyles to use their private pond for stocking in return for future broodstock access and for public fishing access by permission if the introduction is successful. Boyle's Pond is located north of the Snake River at Menan Buttes in Jefferson County.

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JOB PERFORMANCE REPORT

State of: Idaho **Name:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-12

Job. No.: 6 (IF)-c[l] **Title:** Region 6 (Idaho Falls) Rivers and Streams Investigations

Period Covered: July 1, 1987 to June 30, 1988

ABSTRACT

During population sampling in 1987 in the South Fork Snake River, we observed low densities of cutthroat (17.3/hectare) and brown (14.3/hectare) trout in the Palisades area. Whitefish densities (2,156/hectare) in 1987 were similar to those observed in Conant Valley in 1982. In the Lorenzo area, brown trout densities (57.8/hectare) were considerably higher than those found in Palisades area and outnumbered cutthroat trout approximately 3:2.

Drought conditions persisted through 1987 resulting in adverse conditions for fish populations in the South Fork Snake River. Palisades Reservoir was drawn down severely, resulting in an unknown flush of fish through the dam into the South Fork. We salvaged the Palisades Dam tailrace following Bureau of Reclamation flow reductions. Lake trout were the most numerous of trout species collected, indicating a major outmigration from Palisades Reservoir. Following flow reductions, we salvaged South Fork side channels downstream from Swan Valley. Juvenile cutthroat and brown trout populations were seriously impacted due to isolation and stranding in dewatered side channels. The 1987 brown trout redd count was the third highest on record (530 redds) but represents a decline from the previous two years. The decline may have been influenced by flow reductions.

Angler surveys indicate a decline in catch rates in the Palisades area during the early season (April 1 to Memorial Day Weekend). Anglers fishing the restricted harvest area had an estimated 3.4 fish per hour catch rate in July 1987 (compared to 0.5 fish per hour in 1982). During October in the restricted area, catch rates averaged 2.4 fish per hour, about four times higher than during October of 1982.

Trout populations in two sections of the lower Henrys Fork are low compared to densities on all sections of the South Fork. Habitat appears to be the limiting factor. Cutthroat trout were the most abundant species at both sampling sections. The cutthroat population of the lower Henrys Fork is composed almost entirely of adult fish. Rainbow trout densities are similar to cutthroat trout, but juvenile rainbow trout are more prevalent. The lack of spawning habitat in this area appears to be limiting natural production.

Voluntary creel census from North Fork Club members, fishing the Macks Inn area indicates good catch rates, small fish and a low return on hatchery rainbow trout.

Electrofishing in lower Willow Creek indicates cutthroat trout populations are declining, with age II+ fish nearly absent from the sample. Brown trout populations were also lower than what we observed in 1983. Utilization of hatchery rainbow trout after Labor Day appears to be low, based on the high number observed during September sampling.

Brook trout populations in Homer Creek showed an increase at Site 2 where beaver ponds have become the predominant habitat type. Wild cutthroat trout also showed a slight increase in numbers from 1983. Hatchery cutthroat trout showed similar growth to wild fish. Drought conditions resulted in beaver ponds providing some of the only habitat on the stream as other sections went intermittent.

Authors:

Chip Corsi
Regional Fisheries Biologist

Steve Elle
Regional Fisheries Manager

OBJECTIVES

1. To evaluate status of trout populations in the South Fork Snake River under various management schemes.

2. To salvage trout from side channels and at Palisades Dam to help offset losses resulting from Bureau of Reclamation flow reductions.

3. To assess brown trout spawning trend in the South Fork Snake River.

4. To evaluate angler effort and success on the South Fork Snake River, and to collect public input on existing and proposed special regulations for cutthroat on the South Fork Snake River.

5. To evaluate status of trout populations in the lower Henrys Fork to develop baseline data and formulate management recommendations.

6. To obtain more recent creel data from upper Henrys Fork anglers.

7. To evaluate status of cutthroat trout populations in Willow Creek in response to late season openers on spawning tributaries.

8. To evaluate introductions of Henrys Lake cutthroat trout into Homer Creek.

RECOMMENDATIONS

1. Extend general season and special cutthroat regulations on the South Fork Snake River from Irwin upstream to Palisades Dam.

2. Conduct population estimates on the South Fork Snake River during 1988 to evaluate drought impacts.

3. Obtain aerial photographs of the South Fork Snake River at different flows to evaluate side channel losses resulting from flow reductions.

4. Work with Bureau of Reclamation and irrigators to provide adequate flows for trout in the South Fork Snake River during winter reservoir storage months.

5. Conduct experimental stocking of Henrys Lake cutthroat trout fingerlings in the lower Henrys Fork (downstream from Highway 33) to determine if supplemental stocking will increase population densities.

6. Study upper Henrys Fork to identify reasons for apparent small size of fish in the creel and determine return to creel rates for hatchery rainbow.

7. Eliminate fall and late summer stocking of catchable rainbow trout in Willow Creek due to low utilization.

8. Fin clip brown trout fingerlings prior to stocking in Willow Creek to assess their long-term contribution to the fishery.

9. Continue to ensure that all rainbow trout stocked in the Willow Creek drainage (including Ririe Reservoir) are from fall spawning stocks to prevent hybridization with native cutthroat trout.

10. Continue evaluation of the Willow Creek trout population to assess response to late season opener on spawning tributaries.

TECHNIQUES USED

South Fork Snake River

Population estimates were completed for two sections of the South Fork Snake River during 1987 near Lorenzo and Palisades (Figure 1). We attempted to conduct an estimate in the Conant Valley section, but low flow releases from Palisades Dam contributed to poor efficiency and we abandoned the estimate. Electrofishing was conducted during March at Palisades, September and October at Lorenzo and November at Conant Valley. A jetboat with boom-mounted anodes was used at Lorenzo and Palisades, while a drift boat with boom-mounted anodes was used at Conant Valley. Two marking runs, followed by one recapture run one week later, constituted the sampling effort. Fish were marked using either a fin clip or fin punch. Trout densities were estimated at both Lorenzo and Palisades. In addition, we conducted a whitefish estimate at Palisades.

Fish salvage operations were conducted in dewatered side channels following flow reductions to below 22 cms. We also salvaged fish from the Palisades Dam stilling basin while it was being dewatered for repair. All salvaging was conducted with backpack electroshockers.

As in the past (Moore 1980), brown trout spawning surveys were conducted from an airplane. Redd counts began at Palisades Dam and ended at the confluence with the Henrys Fork. In 1987, the count was conducted on December 4 at midday.

Creel census was conducted during the first two months of the early season on the Irwin to Palisades Dam section. Census methodologies were the same as those described in previous reports (Corsi 1986). One weekday and one weekend day per two-week interval were censused. Three angler counts were made each count day. Anglers were interviewed both on the river and by leaving a stamped, addressed questionnaire on the windshields of angler vehicles (Appendix 1).

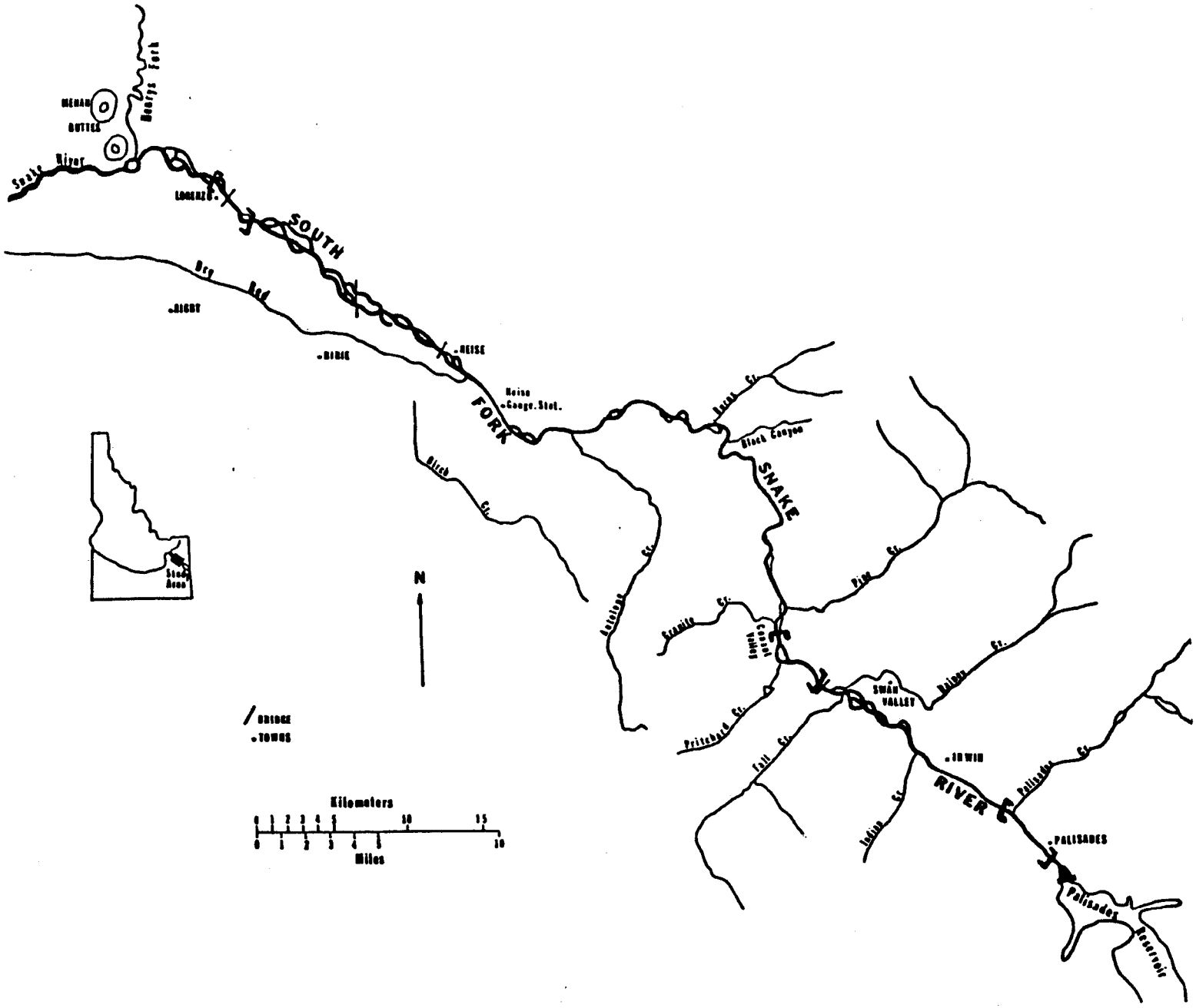


Figure 1. Map of South Fork Snake River with Lorenzo, Conant Valley and Palisades electrofishing sections.

Henrys Fork Snake River

Population estimates were conducted on two 6.4 km long reaches of the Henrys Fork downstream from St. Anthony in October 1987 (Figure 2). The lower reach was located between the mouth of the Texas Slough and the Menan Buttes; the upper reach was located between the Hibbard Bridge and the Fish and Game Department access downstream. Additional sampling was conducted immediately downstream from the Hibbard section to assess species presence and relative abundance and collect additional length and weight data. All sampling was conducted with a jetboat and boom shocker arrangement. Chapman's modification of the Peterson Method (Ricker 1975) was used to estimate population size, with two marking runs and one recapture run used for each estimate. Lengths were collected on all trout captured, with a subsample of the Hibbard area trout being weighed. Jaw tags were placed on most cutthroat trout longer than 250 mm to assess future movement. All fished marked for population estimates received a caudal clip. An estimate was made for whitefish at the downstream site. Sampling efficiency was used to determine which size groups estimates would be computed for.

Members of the North Fork Club were asked to participate in a voluntary creel survey during 1987. The survey was conducted on the Henrys Fork from Island Park Reservoir to Henrys Lake Outlet. Anglers recorded the number of hours fished each day as well as the numbers of each species caught and released. Lengths of fish landed were also recorded by some of the volunteers. Data were collected throughout the fishing season.

Willow Creek Drainage

Willow Creek

A mark-recapture estimate was made on a 3.2 km long reach of Willow Creek downstream from Kepps Crossing, including some of the water sampled during 1983 (Corsi 1984). Fish were marked on September 28 using electrofishing gear mounted in a canoe with a handheld anode. Two backpack shockers were used on the October 5 recapture run due to the low water conditions. Fish were marked with a caudal clip and measured to the nearest millimeter. We placed jaw tags on cutthroat trout to further evaluate their movement patterns.

Homer Creek

We electrofished two sections of Homer Creek during August 1987 to evaluate the success of fingerling cutthroat trout plants made in 1986. The three-pass method was used in Section 2 (Corsi 1984). We attempted an estimate in Section 1, but too few fish were present on the first pass to warrant additional passes. All fish were captured with the backpack shocker.

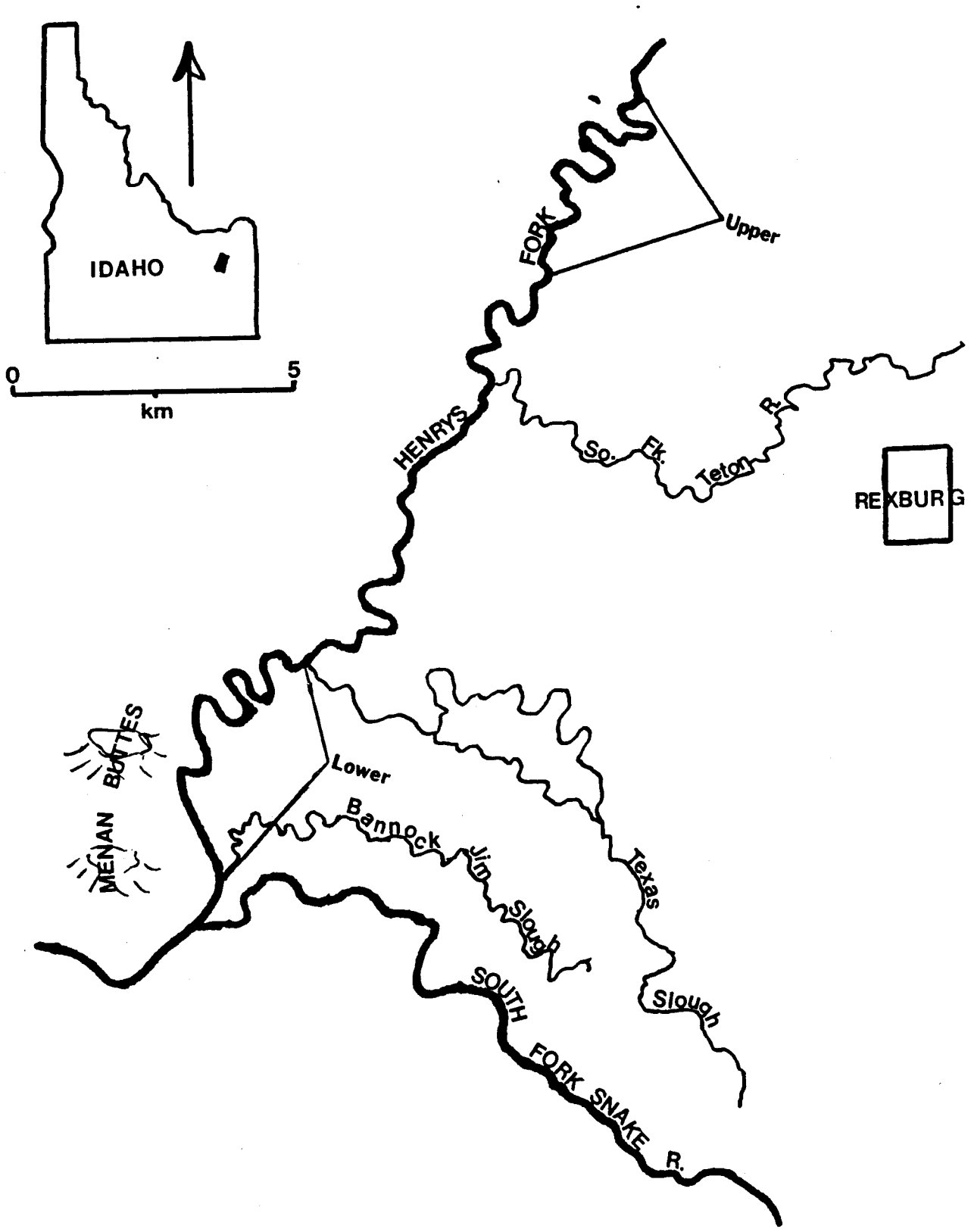


Figure 2. Map of lower Henrys Fork showing 1987 electrofishing sites.

Henrys Lake Tributaries

Population estimates were conducted on two sections of Duck Creek and one section of Howard Creek during August 1987. Section 1 of Duck Creek lies within the grazing exclosure, while Section 2 is upstream in a grazed area. The Timber Creek section is in a grazed section.

FINDINGS

South Fork Snake River

Electrofishing

Population estimates for wild cutthroat trout at Lorenzo and Palisades indicate that densities in those reaches are considerably lower than those observed in Conant Valley during 1986 (Elle et al. 1987, Table 1). Brown trout densities are higher in the Lorenzo section than in either of the other two sections. Other species (rainbow trout, hybrids, hatchery cutthroat trout and lake trout) are more common in the Palisades area (Table 2). Hatchery cutthroat trout and lake trout are recruited to the South Fork fishery as a result of emigration from Palisades Reservoir. Numbers of hatchery cutthroat trout and lake trout in the river are believed to be directly related to drawdown of Palisades Reservoir (Moore and Schill 1984). Rainbow trout, and hence hybrids, may be the result of a small commercial hatchery operation that had been situated on Rainey Creek but which is no longer operated.

Population structures of cutthroat trout were similar for both the Lorenzo and Palisades areas, but the Conant Valley data show a greater number of juvenile fish present in the population (Figure 3). Several factors may be contributing to these discrepancies, including time of sampling and habitat considerations. At Lorenzo, cutthroat trout populations are probably dependent on downstream movement from upriver spawning areas. Juveniles may not become established in the Lorenzo area until they are age 2+ following late fall movement (Moore and Schill 1984). The Palisades section was sampled during the spring when mature cutthroat trout may have been staging prior to spawning. At Conant Valley, where no estimate was conducted, we found all age classes. Conant Valley is situated near two spawning tributaries (Pine Creek and Rainey Creek) and has suitable rearing habitat. Sampling was also conducted in November when juvenile fish are more likely to have moved out of tributaries. We did observe, however, that the age 2+ fish were poorly represented in the sample (Figure 3), a phenomenon we also observed in Willow Creek. A possible explanation for this would be poor survival of the 1985 cohort due to some environmental factor. Catch curves for all areas suggest good survival from age 4 to 5 (Figure 4) and suggest improved survival in the Conant Valley section.

Table 1. Comparison of brown and cutthroat trout densities (fish >250 mm/hectare) from different sections of the South Fork Snake River, 1986 and 1987.

Section	Date	Species	Density (95% CI)
Palisades	3/87	WCT	17.3(10.3-35.2)
		BRN	14.3(8.6-29.2)
Conant Valley	11/86	WCT	167.2(134.1-214.7)
		BRN	21.9(17.7-27.8)
Lorenzo	9-10/87	WCT	43.6(28.8-74.0)
		BRN	57.8(38.2-98.1)

Table 2. Comparison of salvage records for the Palisades Dam stilling basin from 1981 to 1987.

Date	BRN	LKT	WCT	HCT	RB x HYB	COHO	WF
10/5/81	152	257	17	9	0	0	b
11/1/83	314	55	54	a	0	0	b
10/4/85	61	50	7	a	0	1	b
10/10/86	427	33	10	16	2	0	b
10/17/87	108	171	16	4	0	0	83

[a]Hatchery fish not distinguished from wild fish.
[b]Whitefish not salvaged.

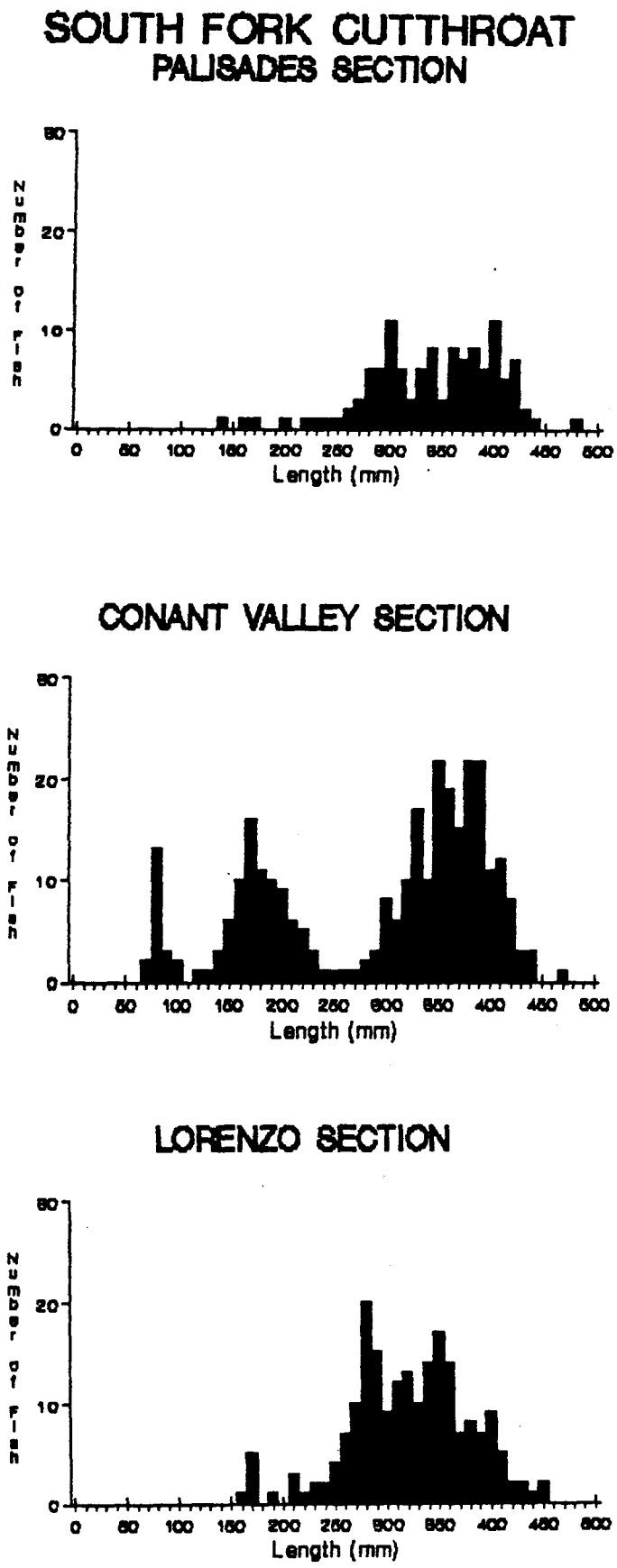


Figure 3. Length frequency distribution of wild cutthroat trout sampled from the South Fork Snake River during 1987.

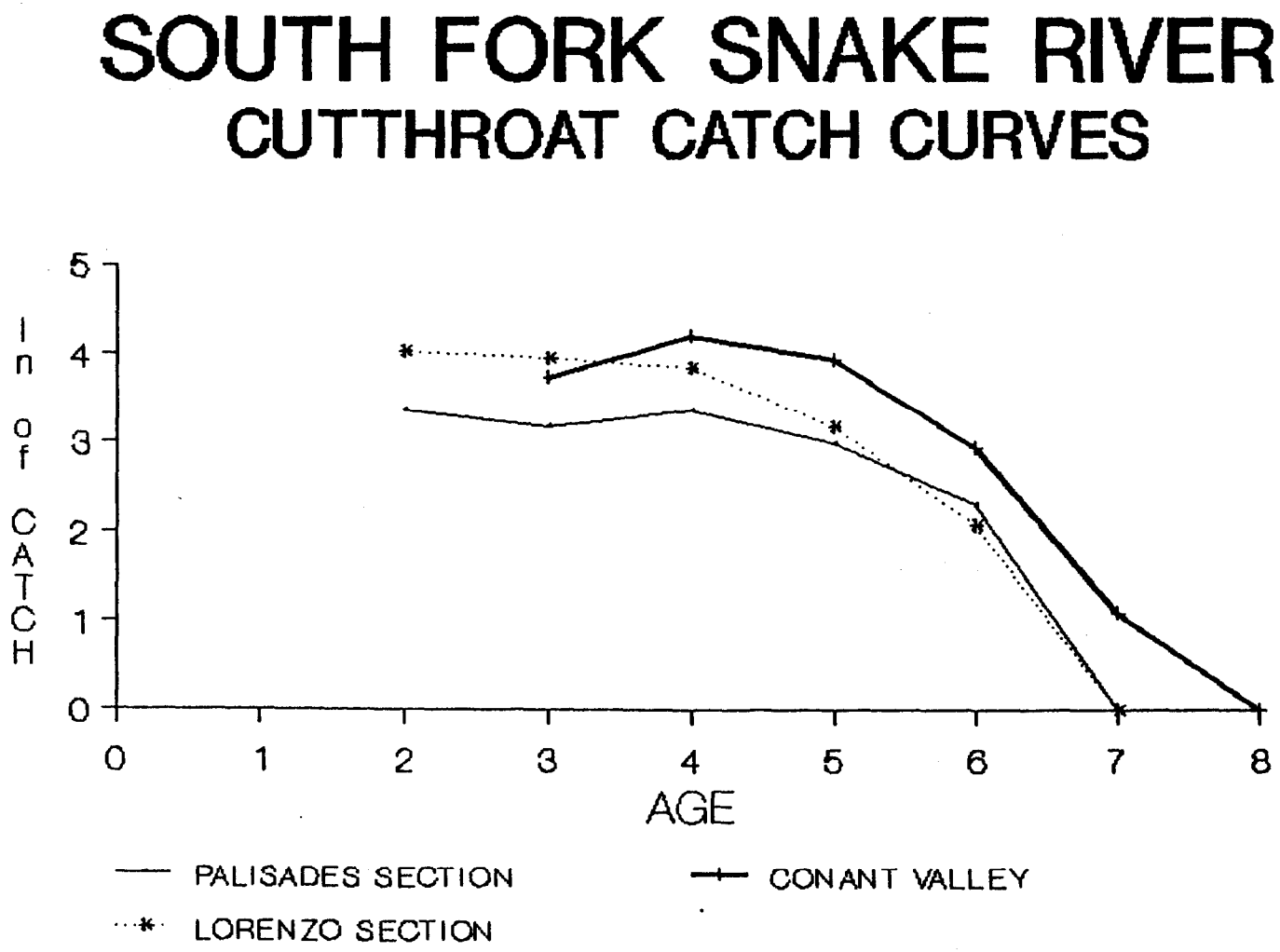


Figure 4. Catch curves for wild cutthroat trout captured from the South Fork Snake River during 1987.

The length frequency distribution of brown trout from the Lorenzo area indicates a population which has all age groups present (Figure 5). The sample at Conant Valley was comprised largely of juvenile and small adult fish, while in the Palisades section the population was largely comprised of adult fish. In 1986, we observed a brown trout population which consisted of all age classes in Conant Valley. Low flows and possibly a later spawning run this year may account for the lack of large fish in the sample. We do not believe we are as efficient at electrofishing from the drift boat in low flows as we are from the jetboat at higher flows. The higher percentage of large fish in the Palisades sample during spring is probably due to fish overwintering in the upper river following spawning. Juvenile fish may also be rearing further downstream. Catch curves for each section would suggest that the mortality rates on brown trout are low until natural mortality at the older ages takes effect (Figure 6).

The estimate for whitefish density in the Palisades section was 2,156/hectare (1,228/hectare $\leq$ N $\leq$ 4,802/hectare; 95% CI). The wide confidence limits are indicative of a low recapture rate, despite the fact 1,850 fish were handled during the estimate. However, the estimate of 2,156/hectare closely approximates the estimated density of whitefish in Conant Valley during 1982 (2,300/hectare; Moore and Schill 1984), and we believe our estimate is reasonable.

Salvage

No biological information was collected on fish salvaged from side channels; however, we estimate that several thousand cutthroat and brown trout were moved from dewatered side channels to the river channel. Most of the salvaged fish were juveniles aged 0+ to 2+, but fish of all age groups (both species) were present. Because many side channels which became dewatered were inaccessible, we estimate that many more fish were lost than were actually salvaged. The low flow conditions created by the Bureau of Reclamation's decision to reduce outflow to 22 cms will likely result in a weakened 1987 year class of cutthroat trout and 1986 year class of brown trout. Additionally, the apparently high losses sustained by the 1985 and 1986 year class of cutthroat trout and 1985 year class of brown trout may have a serious impact on the South Fork fishery for several years.

Lake trout were the predominant species salvaged in the stilling basin, probably as a result of the extreme drawdown of Palisades Reservoir this year (Table 2). In previous years, brown trout have been the predominant species captured in the tailrace. In 1986, the reservoir was nearly full at the time of salvage, and lake trout numbers were considerably lower than other years when reservoir operation was more normal. The lower percentage of brown trout may also be a function of the additional harvest which occurred when the Palisades Dam tailrace was opened to fishing.

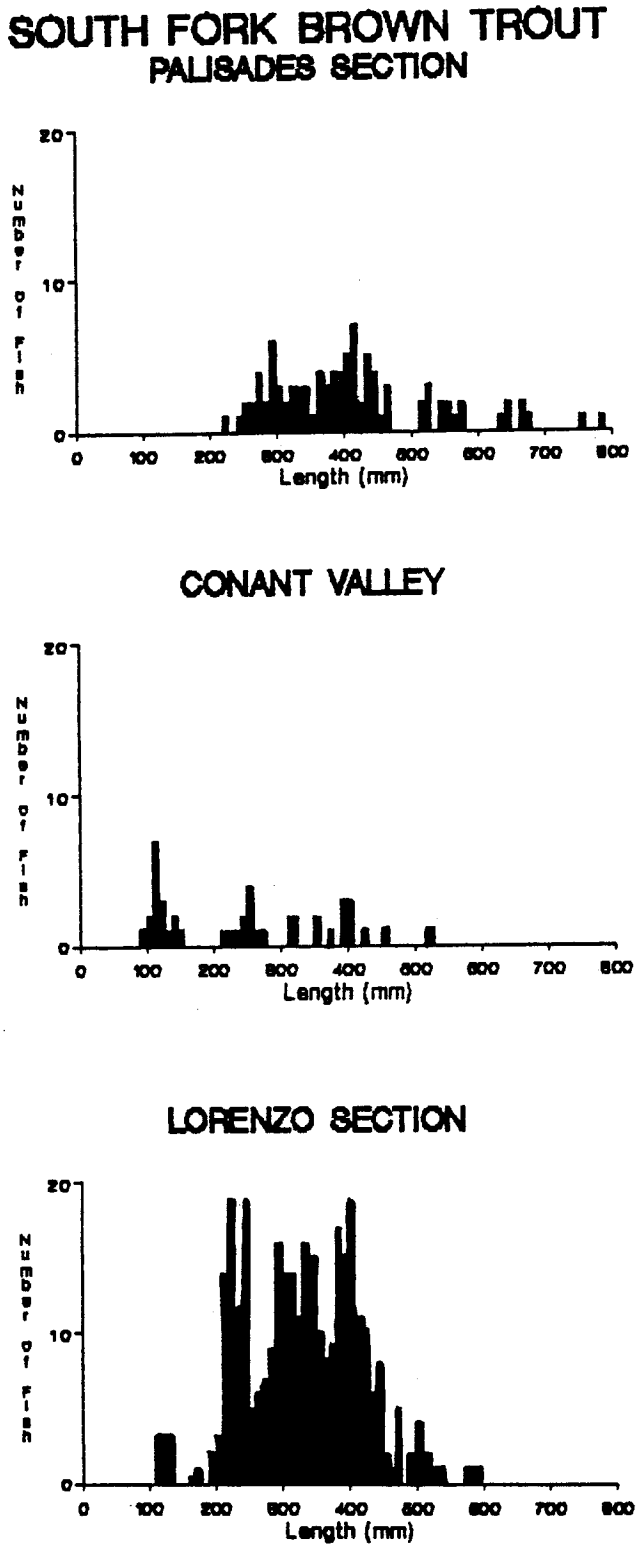


Figure 5. Length frequency distribution of brown trout captured from the South Fork Snake River during 1987.

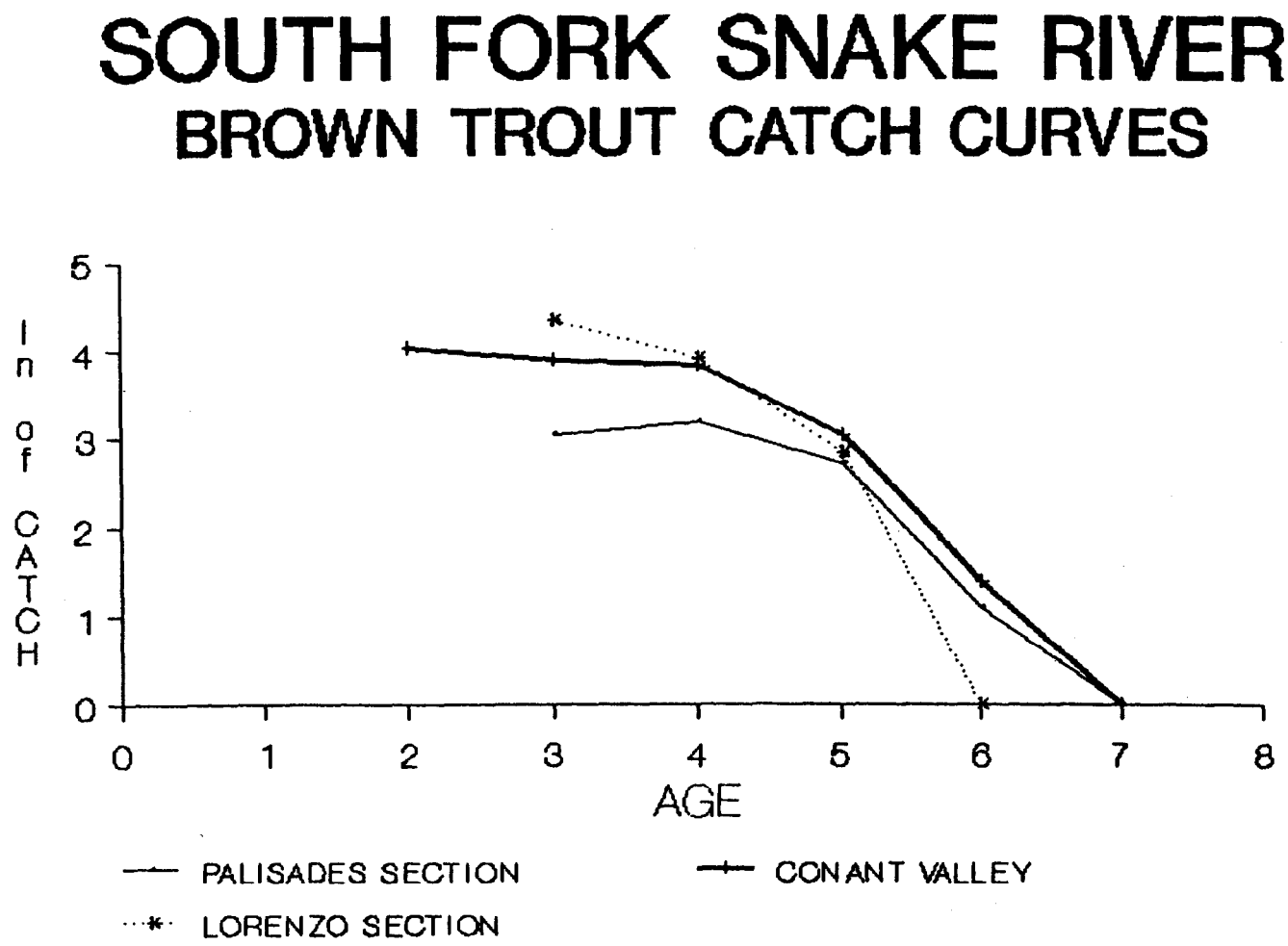


Figure 6. Catch curves for brown trout captured from the South Fork Snake River during 1987.

Redd Counts

A total of 530 brown trout redds were counted during 1987. This represents a reduction from the previous two years but is still the third highest count on record (Table 3). Counts were noticeably down in the afterbay section and from Conant Valley reach and Heise Bridge to the mouth reach. At the afterbay, we observed that the group of redds normally associated with the middle of the river were not present. We believe this is a factor of reduced flow, but harvest of large fish in the tailrace may also account for the lower count as well as increased harvest during the early (April-May) season. We noted that locations of other spawning concentrations had also moved. Most side channel spawning habitat was eliminated by flow reductions.

Angler Surveys

Anglers fished an estimated 17,226 hours during the early season (April 1 to May 22) on the upper river. Approximately 35% of the effort occurred on opening day when anglers began fishing at midnight. Overall, catch rates for trout were .34 fish per hour. Cutthroat trout dominated the catch making up .68% of the 3,950 trout harvested, followed by brown trout (231), lake trout (5%) and rainbow or hybrid trout (3%). Seventy-one percent of the cutthroat trout checked were hatchery fish which had moved out of Palisades Reservoir.

Mean lengths of fish in the creel were highest for lake trout and brown trout (Table 4), but the mean length of checked wild cutthroat trout indicates that most of the wild cutthroat trout harvested were mature fish.

The 657 wild cutthroat trout harvested represent a significant portion of the estimated fish available prior to the season (1,606), based on the March electrofishing and an expansion of the estimate to include all of the upper river (Irwin to Palisades Dam). Although habitat in the afterbay is somewhat different from the rest of the section (which is somewhat homogeneous), we believe expansion of the estimate is reasonable. The estimated harvest of wild cutthroat trout compared to the estimated number available is indicative of high angler mortality on fish prior to spawning. Estimated catch and harvest of wild cutthroat trout have declined since 1982 despite increased effort (Table 5). Brown trout catch and harvest have increased, but catch rates have declined. Early season has become extremely popular, and the drop in catch rates suggests a declining fishery which we believe is due to overharvest. Cutthroat trout are spawning during this period and are extremely vulnerable. Effort may be high enough that the brown trout population is also being affected.

It appears that the early season opener on the upper South Fork has become somewhat of a social event, with effort tapering off rapidly after the opening day. The emergence of the early season opener as a popular fishery has occurred within just the past few years as effort was only moderate in 1979 and 1982 (Moore 1980, Moore and Schill 1984). Although the fishery has provided additional opportunity for anglers during the early spring, it may be seriously impacting cutthroat populations.

Table 3. Brown trout redd counts on the South Fork Snake River, 1979 to present.

Reach	Distance (km)	Dates 12/11 1979	12/16 1980	12/4 1981	12/8 1982	12/20[a] 1983	12/4 1984	12/10 1985	12/5 1986	12/4[b] 1987
Afterbay of Palisades Dam	0.8	50	61	69	90	49	75	179	294	70
Afterbay to to Irwin	11.2	0	0	0	0	0	51	143	29	2
Irwin to Conant Valley	15.8	6	45	7	4	4	8	65	46	103
Conant Valley to Burns Cr.	16.2	89	104	95	120	96	37	143	311	133
Burns Creek to Anderson Diversion	20.6	14	23	0	57	9	51	8	62	47
Anderson . Diversion to Heise Bridge	5.6	4	0	0	0	0	7	5	0	7
Heise Bridge to Mouth	30.4	14	26	21	NC	NC	23	65	67	168
Total	100.6	177	259	192	271	158	252	608	809	530

[a]Counts should be considered low due to poor visibility from fog.
[b]Later flights indicated fish spawned later in 1987 than in previous years. On December 14, 105 redds were counted versus 70 on December 4.

Table 4. Mean lengths (mm) of creeled fish from the Irwin to Palisades reach of the South Fork Snake River, 4/1/87 to 5/22/87.

	Species					
	WCT	HCT	BROWN	LKT	WRB	HYB
n	21	52	33	7	3	1
x length	379	342	407	467	380	326

Table 5. Comparison of catch and harvest of wild cutthroat and brown trout from Section 1 of the South Fork Snake River (Moore 1980) during the April to Memorial Day period, for the years 1979, 1982 and 1987. Catch rates (fish/hour) listed in parentheses.

	Year		
	1979	1982	1987
Effort (hours)	5,234	10,679	17,226
Cutthroat catch	517 (.10)	1,198 (.11)	995 (.06)
Cutthroat harvest	375 (.07)	965 (.09)	657 (.04)
Brown catch	402 (.08)	663 (.06)	1,153 (.07)
Brown harvest	395 (.08)	634 (.06)	862 (.05)

Fifty-nine percent of the anglers interviewed fishing the upper river during the early season favored a change to the general season with special regulations. A greater percentage (83%) indicated they would continue to fish the upper river if regulations were changed. Anglers interviewed during the general season on all sections of the river favored a change to general season-special regulations for the upper river by a 68 to 17 margin (80% in favor). Opposition to the proposal at public meetings was light, with only 7 of 32 people voicing an opinion opposed to a change. Based on the angler opinion data, it appears most anglers believe that extra measures need to be taken to improve the fishing in the upper river. The most commonly voiced complaint from anglers was that early season fishing opportunity would be lost. Some anglers favored a change to general season with special regulations because it simplified the regulations for the upper river.

Anglers fishing the Heise to Irwin section of the river believe that fishing has improved since the implementation of special regulations in 1984. Of 53 anglers voicing an opinion, 33 (622) stated fishing had improved and 30% felt it had stayed the same. Only four anglers (7%) believed fishing had declined. This percentage of the anglers probably contributed to the high number who favored a change to special regulations in the upper river.

Catch rate data from the special regulations reach of the South Fork indicate that fishing was good during 1987. During July, anglers who responded to the questionnaire fished 311.5 hours and caught 956 cutthroat trout, 60 brown trout, 16 rainbow or rainbow x cutthroat hybrid trout and 1 lake trout for a catch rate of 3.4 fish per hour. During July of 1982, catch rates for trout in what is now the special regulations area averaged 0.5 fish per hour (Moore and Schill 1984). During October, we interviewed anglers at big game check stations who had fished a total of 47 hours in the special regulations area. They caught 108 cutthroat trout and 6 brown trout for a catch rate of 2.4 fish per hour. The 1979 survey indicates catch rates of 0.6 trout per hour during October.

Henrys Fork Snake River

Electrofishing

Estimated densities of trout in both sections of the lower Henrys Fork were low (Table 6). Cutthroat trout were the most abundant species captured (fish >250 mm), followed by rainbow trout in both sections. Brown trout, rainbow x cutthroat hybrids and lake trout were also captured. Large, mature fish (>300 mm total length) comprised the majority of the cutthroat trout in both reaches (Table 7), with the largest fish captured a 635 mm female (Figure 7). Most rainbow trout observed were juveniles, but large specimens were also observed (Figure 8). Brown trout were more commonly observed in the lower reach, and hybrids were more common in the upper reach.

Table 6. Estimated densities of fish (fish/hectare) from two sections of lower Henrys Fork, October, 1987.

Section	Size group	Species All	(95% CI)	WCT	WRB	HYB	BRN	LT
Texas Slough to Menan Buttes	≥250 mm	5.8	(3.8-9.8)	3.4	1.6	0.1	0.7	0.1
	<250 mm	2.8	(1.7-5.6)	0.7	2.1	<0.1	0.0	0.0
Hibbard Area	≥250 mm	14.3	(7.9-33.9)	8.4	5.0	0.7	0.1	0.0
	<250 mm	No Estimate						

Table 7. Percentage of fish sampled from the lower Henrys Fork larger than a specified size.

Location	Size (mm)	Species WCT	WRB	BRN	HYB	LT
Texas Slough to Menan Buttes	≥200	100	64	100	100	100
	>300	61	17	88	33	100
	≥400	30	5	50	33	100
	>500	11	5	33	0	0
	≥600	1	0	0	0	0
Hibbard Area	≥200	98	79	100	90	0
	≥300	64	18	0	20	0
	≥400	43	4	0	20	0
	≥500	16	2	0	10	0
	≥600	0	1	0	0	0

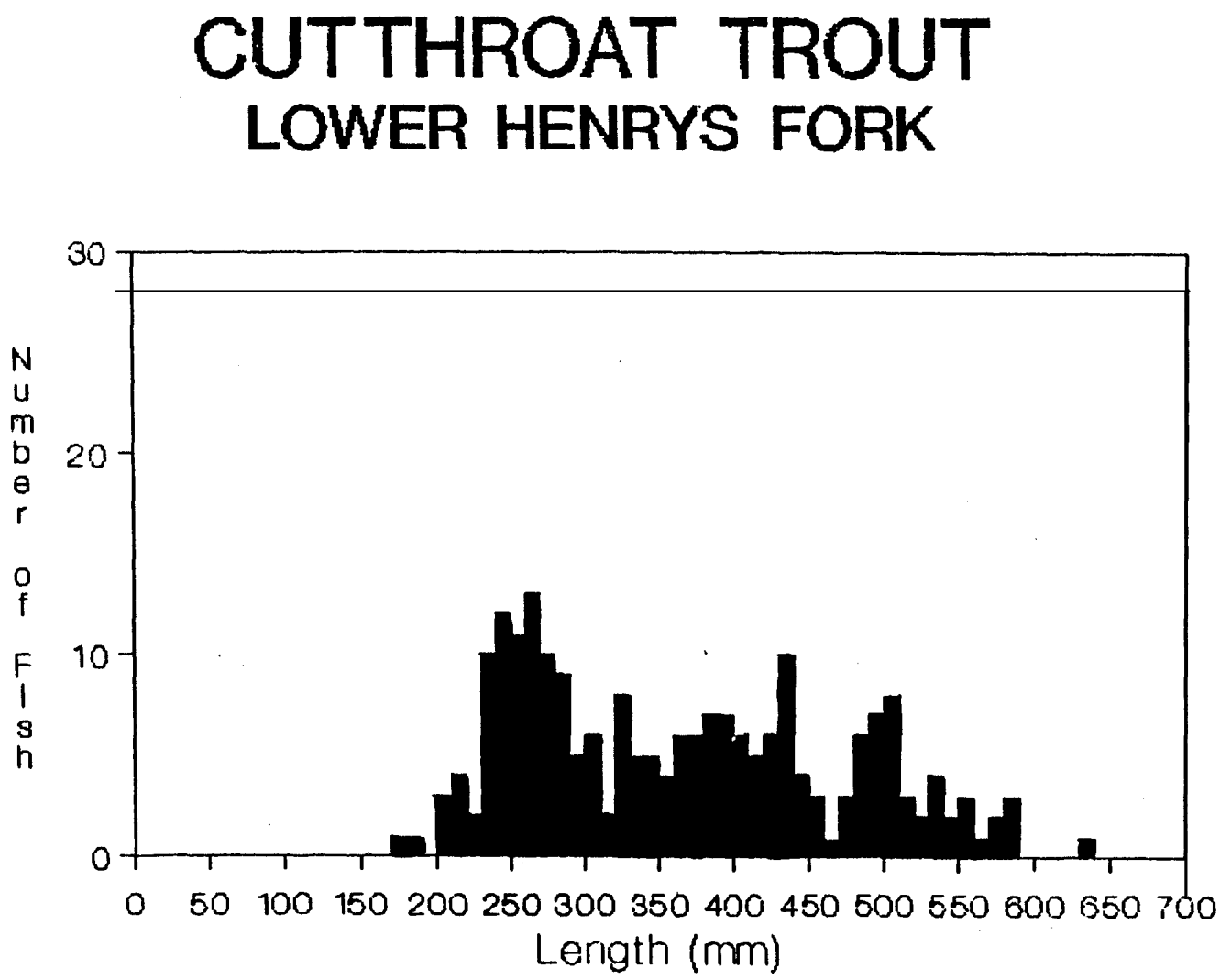


Figure 7. Length frequency distribution of wild cutthroat trout captured at the Hibbard Bridge and Texas Slough sampling areas of the Henrys Fork during fall, 1987 (n = 210).

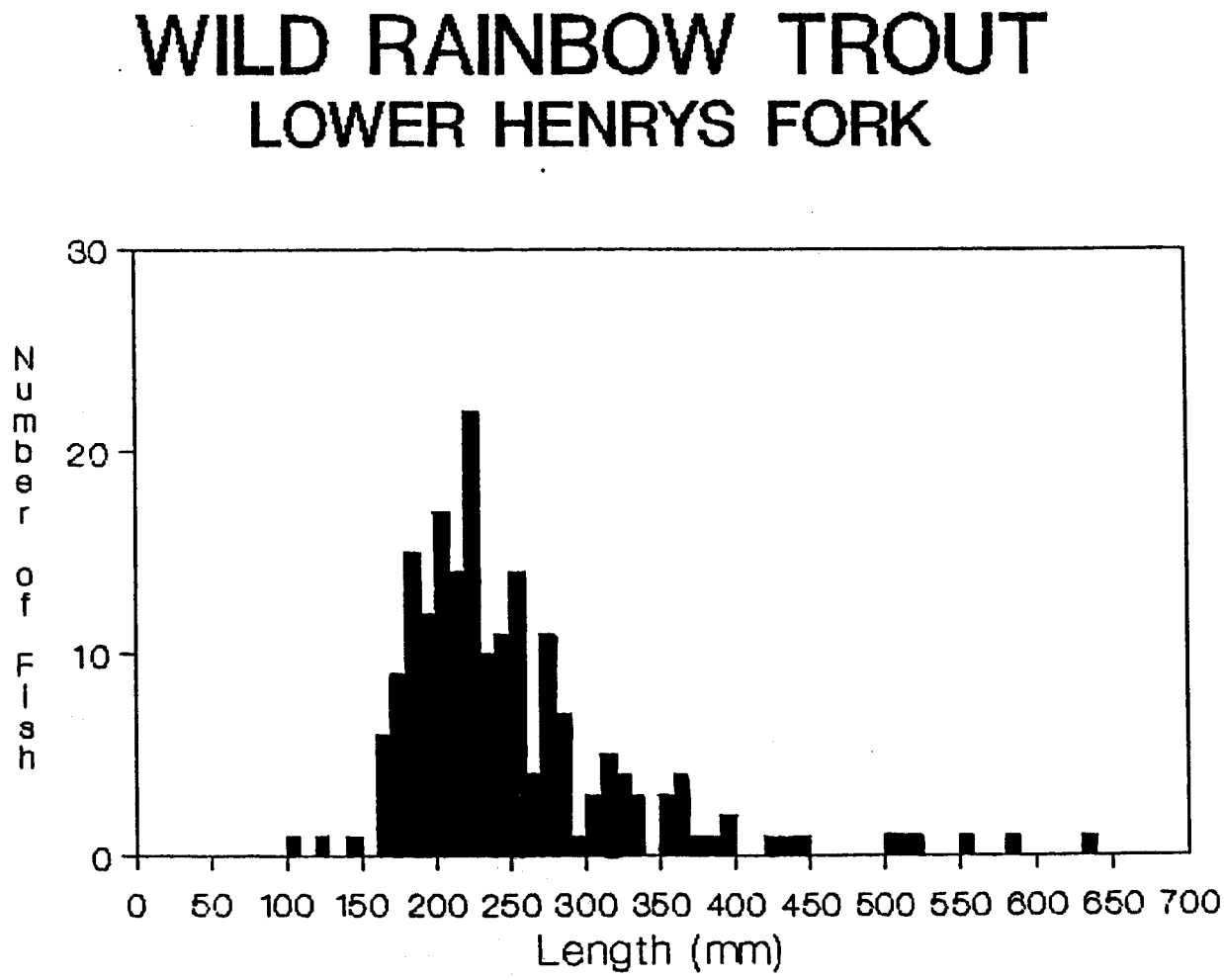


Figure 8. Length frequency distribution of wild rainbow trout captured at the Hibbard Bridge and Texas Slough sampling areas on the Henrys Fork during fall, 1987 (n = 189).

The reliability of the population estimate for the Hibbard area is suspect due to the low number of recaptures and because two marked fish were subsequently recaptured outside of the sampling section. One of these fish, a 457 mm cutthroat trout, was captured a short distance downstream from the sampling section on the day of the recapture run. The fish had received a bird wound between marking and recapturing and may have dropped downstream due to a weakened condition. We excluded this fish from the estimate, treating it as a mortality. A second fish, a 326 mm long cutthroat trout, was recaptured in the downstream sampling area, some 15 to 20 km downstream, two days following the recapture run. For purposes of the Hibbard estimate, we assumed (perhaps falsely) that the fish did not move until after the recapture run and, thus, included that fish in the estimate. Corsi (1986) observed long distance movements by cutthroat trout over a short time span in the Willow Creek drainage.

It appears from the population structure of cutthroat trout that the lower Henrys Fork is primarily **a** holding and wintering area for adult fish. Actual biomass supported (per unit area) of cutthroat trout in these reaches may approach that of some sections of the South Fork Snake River where fish are generally smaller. Presumably, these fish spawn in the Teton River system, with juveniles rearing for two to three years before moving downstream into the Henrys Fork. Observations of large cutthroat trout in the Moody Creek spawning run (Corsi and Elle 1986) support this theory, as do observations made on other Yellowstone cutthroat trout populations in Idaho (Thurow 1982; Moore and Schill 1984; Corsi 1986). Spawning habitat in the lower Henrys Fork appears to be limited and of poor quality. Aside from the Teton River system, some fish may be using sloughs or irrigation returns as spawning areas.

In contrast to the cutthroat trout population, the rainbow trout population appears to be comprised primarily of juvenile fish. Whether these are fish which were spawned in the lower Henrys Fork and Teton River systems or fish which recruit from the Henrys Fork upstream from St. Anthony is unknown. The length frequency distribution suggests a high attrition rate of fish larger than 300 mm. Possible explanations for this include: high mortality, the fish are of **a** fall spawning stock and the adults had moved out of the area, or many of the fish are transients which do not remain in the area after achieving a larger size. Angling mortality is not a likely explanation as access is limited and the large percentage of mature cutthroat trout indicate low fishing pressure.

Brown trout are probably more common in the lower reach because of the proximity to the South Fork Snake River, which has a substantial brown trout population. In all likelihood, the lake trout had moved downstream out of Palisades Reservoir and through the South Fork Snake River before moving up the Henrys Fork. Hybrids, on the other hand, are probably more common further upstream because of the proximity to the Henrys Fork upstream from St. Anthony, where rainbow trout are the dominant species and the potential for hybridization is greater.

Large trout in both sections tended to be robust (Table 8), indicating that forage was not limiting. We observed large numbers of suckers, sculpin, dace and whitefish in both sections. The estimate for whitefish in the lower reach showed a density (134.3/hectare) more than 15 times

Table 8. Back-calculated weight (g) at length (mm) for rainbow and cutthroat trout from the lower Henrys Fork, 1987.

Species	Length (mm)																				
	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
Rainbow[a]	7	13	22	33	48	67	90	119	153	193	240,	294	357	427	509	596	695	805	926	1,059	1,205
Cutthroat[b]	6	11	19	29	43	62	85	114	149	191	240	299	366	443	531	630	742	868	1,007	1,161	1,331

[a]Equation used: w = 0.0000036 3.16
[b]Equation used: w = 0.0000012 3.35.

higher than that of trout. Many of the whitefish captured were juvenile fish which could be utilized as forage. Forage for juvenile fish may be limiting. Riffles with clean gravels are uncommon, and the substrate in both reaches is primarily silt due to low gradient, agricultural inputs and the large scale deposition resulting from the Teton Dam disaster. Limited invertebrate production for juveniles may partially explain the high attrition rate observed for rainbow trout.

Spawning habitat in both sections appears to be extremely limited. Due to the low gradient, little flushing of sediment deposits resulting from the Teton Dam failure has occurred. The river bottom substrate is primarily made up of fine sand up to six to eight inches deep in several locations we checked. The few riffle areas present are impacted by fine sediments.

Angler Surveys

Data from 106 fishing trips were turned in by volunteers from the North Fork Club. In all, they fished 228 hours and caught 456 fish for a catch rate of 2.44 fish per hour. The overall release rate was 11.9%, although some species were harvested at a greater rate than others (Table 9). According to the volunteer report forms, only 12.9% of the fish caught were hatchery rainbows. This may be a factor of misidentification, or poor return.

More trips were recorded in July than in any other month of the season. Catch rates were also higher during *July* but were above the management plan goals of 0.7 fish per hour most of the season (Table 9). Anglers participating were probably more skilled than the average angler, and the high catch rates are probably not truly representative of the fishery. A full creel census in 1988 will serve to monitor the entire fishery. It may be possible to use North Fork Club volunteer census data as a trend indicator to monitor the fishery in future years, if a relationship exists between their catch rates and those of the general public.

Anglers were asked to record fish lengths from a representative sample of the fish they caught (i.e., all of the fish caught on a given day). However, anglers collected only limited length data, most of which was not usable. It did appear that most of the fish caught were less than 254 mm long.

Willow Creek Drainage

Willow Creek

An estimated 31 ($19 \leq N \leq 61$) cutthroat trout and 41 ($26 \leq N \leq 75$) brown trout were present in the sampled reach of Willow Creek. Low flows prevented sampling all the way through the 1983 section. Only the upper half was sampled in 1987. Population estimates were converted to aerial

Table 9. Catch and effort data recorded by North Fork Club members during the 1987 volunteer census.

Month	Days fished	Hours/ trip	Species composition caught (harvested) WRB	HRB	CT	BRK	Catch rate
Opener-June 30	14	2.8	43(2)	24(2)	0(0)	21(3)	2.26
July 1-July 31	47	2.0	**198(6)**	40(1)	4(4)	54(7)	3.09
Aug 1-Aug 31	24	1.8	**89(10)**	5(0)	4(3)	28(2)	2.93
Sep 1-Sep 30	15	2.5	19(4)	3(1)	0(0)	13(6)	0.95
Oct 1-Oct 30	2	2.8	2(2)	0(0)	0(0)	0(0)	0.36
Nov 1-Nov 30	4	2.0	5(3)	0(0)	0(0)	3(0)	1.00
Totals	106	2.2	356(37)	72(4)	8(7)	120(19)	2.44

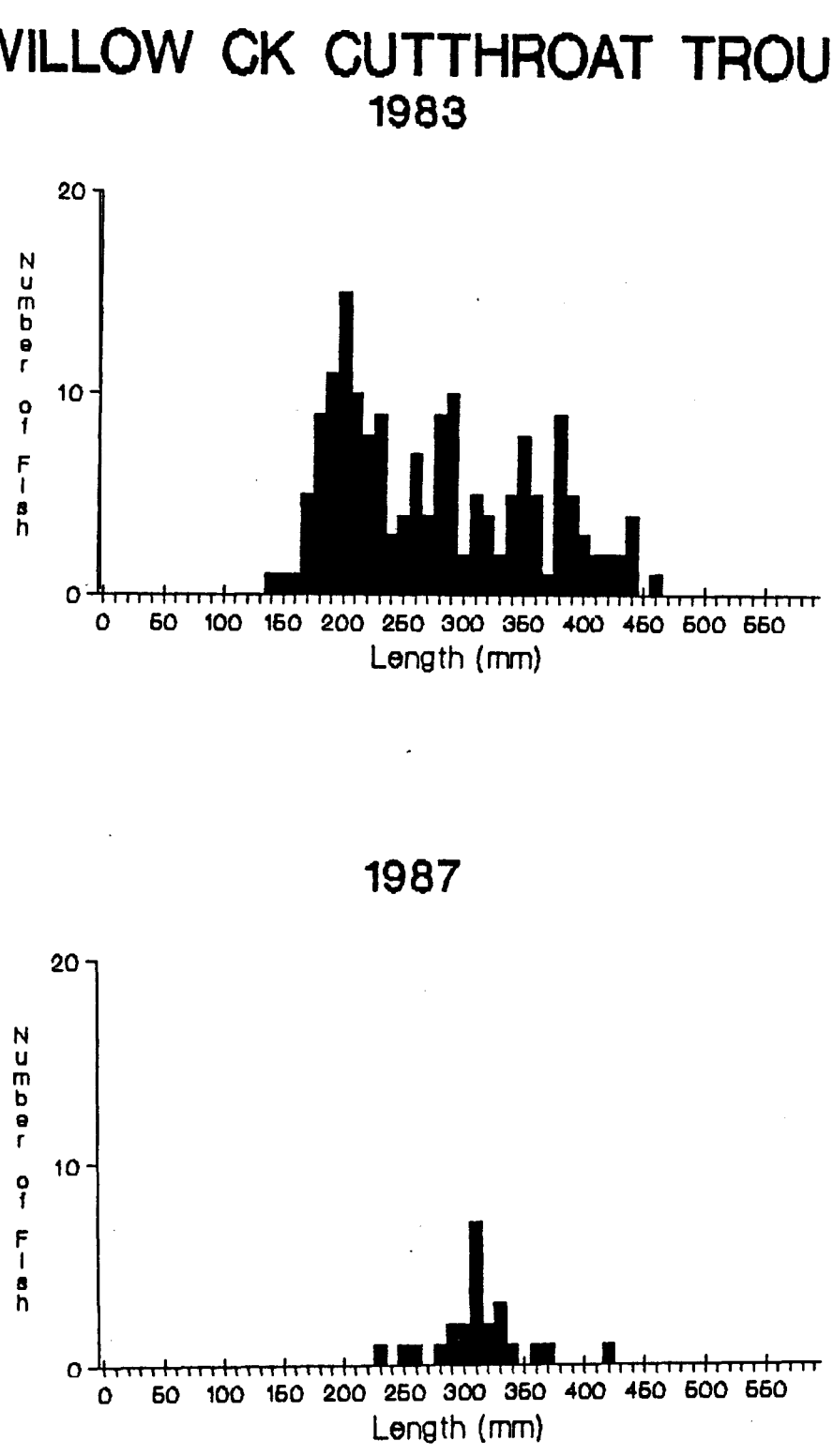


Figure 9. Length frequency distribution of cutthroat trout captured in Willow Creek downstream from Kepps Crossing, fall, 1983 (n = 164) and fall, 1987 (n = 24).

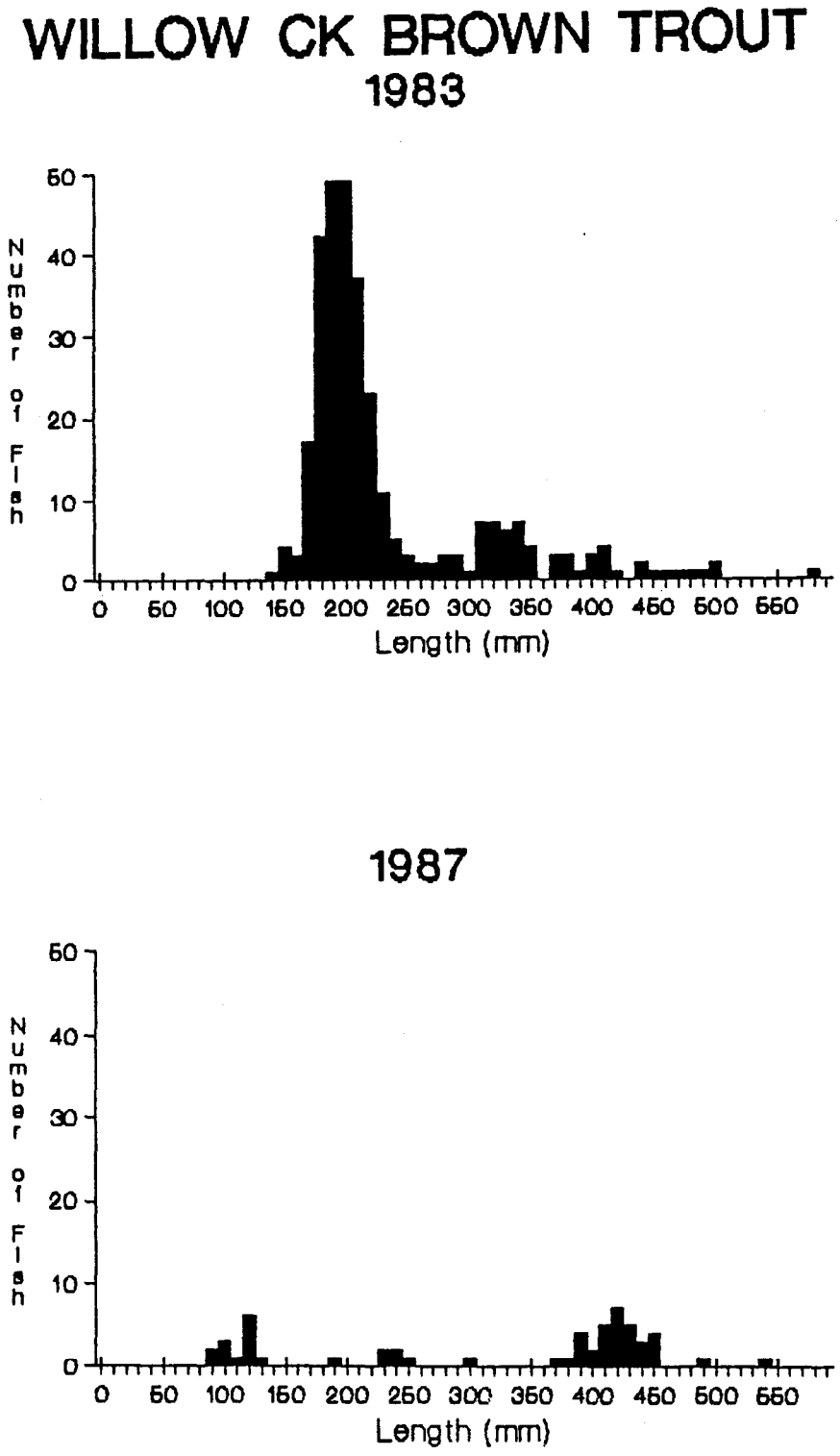


Figure 10. Length frequency distribution of brown trout captured in Willow Creek downstream from Kepps Crossing, fall, 1983 (n = 311) and fall, 1987 (n = 54).

densities to allow for comparison with the 1983 date (Table 10). Cutthroat trout densities showed a sharp decline, largely as a result of the low numbers of juvenile fish observed. However, densities of cutthroat trout larger than 250 mm declined by nearly two-thirds. Brown trout densities were also considerably lower, again a result of fewer juvenile fish being present. Densities of larger brown trout (>270 mm) declined by about one-third. Lengths of fish (both species) were similar to those observed in 1983 (Figures 9 and 10).

Smallmouth bass, which had become established in Ririe Reservoir since 1983, were not present in the sampled reach of Willow Creek upstream of the reservoir.

Several explanations may be offered for the lower densities of juvenile fish. Examination of the stocking records from 1982 and 1986 show that 62,840 brown trout fingerlings were planted in Willow Creek during 1982 and none were stocked in 1986. The 1982 fingerling plant probably contributed most of the fish observed in the two year class observed in 1983 (Corsi 1984). The absence of two-year-old brown trout in 1987 is probably a direct result of no 1986 fingerling-stocking.

Numbers and densities of rainbow trout which are dependent on catchable stocking and utilization, as well as upstream movement of fingerlings planted in Ririe Reservoir, were considerably higher than in 1983 (Table 10). The high number of catchable rainbow observed in 1987 (0.22/100 m^2) is indicative of poor utilization of the fall plant by anglers.

The lack of juvenile cutthroat trout is less easily explained but is probably a factor of the drought conditions which occurred in 1987. Corsi (1986) observed that cutthroat trout were utilizing deeper, slower areas for overwintering. Low water conditions in 1987 may have caused cutthroat trout moving downstream in search of wintering areas to enter Ririe Reservoir rather than remain in Willow Creek. Low flows have resulted in a reduction of wintering habitat in Willow Creek. An elevated harvest of migrating juveniles during June may have also contributed to the reduced numbers observed. Typically, fish in Willow Creek are less vulnerable to harvest during the first two to four weeks of the season because high flows make the stream unfishable.

Homer Creek

Only two trout, both juvenile wild cutthroat, were captured in Section 1. Low flows due to the drought resulted in only limited holding areas for trout in Section 1. The two fish, which measured 108 and 114 mm in length, appeared to be in good condition and active despite a water temperature of 26°C.

Section 2, which in 1983 consisted of run, riffle and pool habitat, has been impounded by a series of small beaver ponds. Wild cutthroat trout and brook trout densities were higher than those observed in 1983 (Table 11). We did not observe any brown trout, and the density of adipose-clipped Henrys Lake cutthroat were higher than the density of wild

Table 10. Estimated densities (fish/100 m^2) of cutthroat, brown and rainbow trout from Willow Creek downstream from Kepps Crossing, 1983 and 1987. Rainbow trout are primarily fish stocked as fingerlings or catchables in Willow Creek and Ririe Reservoir.

Species	Density 1983	1987
All cutthroat	0.60	0.07
Cutthroat >250 mm	0.22	0.07
All brown	1.25	0.15
Brown >270 mm	0.16	0.10
Rainbow	0.50	0.95

Table 11. Estimated densities (fish/l00 m^2) of trout in Homer Creek (Section 2), 1983 and 1987.

Species	Density 1983	1987
Brook trout	4.7	31.3
Wild cutthroat trout	0.2	1.0
Hatchery cutthroat trout	0.0	21.6
Brown trout	0.4	0.0

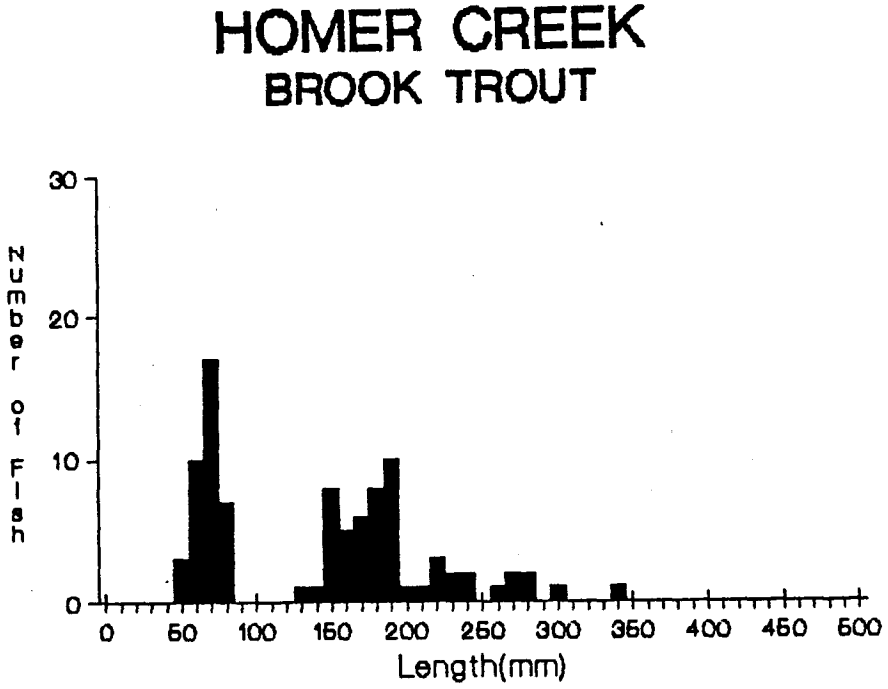
cutthroat trout. Based on length frequency distribution, growth of Henrys lake cutthroat appears to be similar to that of wild fish observed in 1983 (Corsi 1984). Homer Creek continues to support a valuable fishery for brook trout, with specimens in excess of 300 mm long present (Figure 11).

A subsequent visit to Homer Creek in September revealed that flows had continued to decrease and that portions of the stream were intermittent. Beaver ponds continued to hold water. Brook and cutthroat trout were observed in the ponds at Section 2, thus demonstrating the importance of beaver ponds to fish populations in the Willow Creek drainage, particularly in low water years. The higher densities observed in August 1987, when compared with August 1983, indicate that beaver ponds were creating excellent holding areas in that reach of stream.

Henrys Lake Tributaries

The ungrazed area of Duck Creek had the highest density of cutthroat fry, but the grazed section had higher densities of larger fish (Table 12). The grazed section had some deeper pools which held most of the older cutthroat and brook trout. Elimination of grazing from the fenced portion of Duck Creek is starting to result in improvements to the habitat, but, it is still more representative of grazed versus pristine "habitat. Willow plantings done in conjunction with the Henrys Lake Foundation and Soil Conservation Service should help to further stabilize streambanks and improve fish habitat. Several head cut areas continue to show bank failure and will be targeted for tree revetment in the future.

Timber Creek supports a high density of brook trout, but limited numbers of cutthroat (Table 12). Fencing was completed on this section of Timber Creek during fall 1987 to improve habitat. The Henrys Lake Foundation provided most of the equipment, materials and manpower for this small fencing demonstration project.



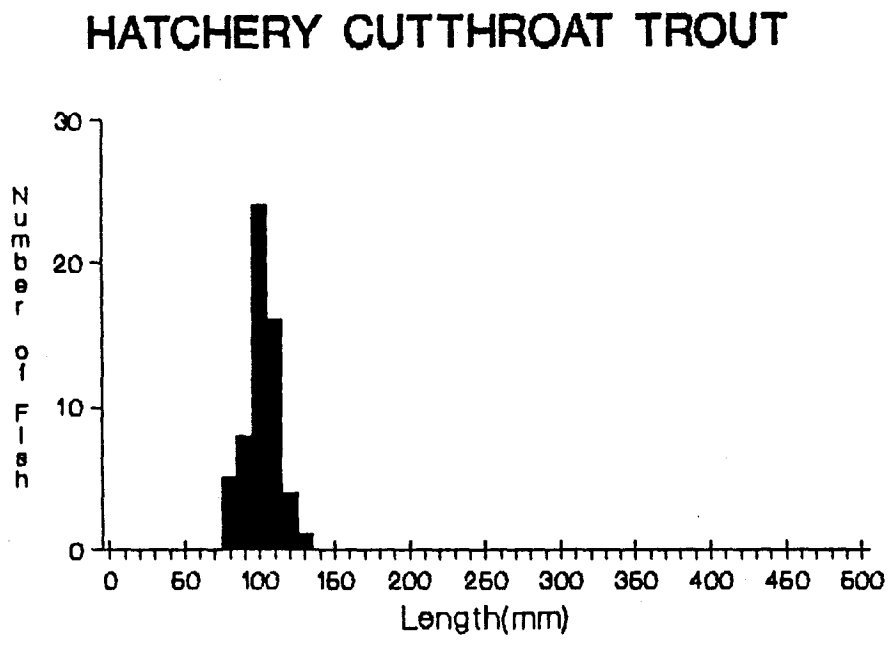


Figure 11. Length frequency distributions of brook trout and hatchery cutthroat trout captured from Homer Creek during August, 1987.

Table 12. Estimated densities (fish/100 m^2) of trout sampled in Henrys Lake tributaries, 1987.

Stream	Section	Density		
		WCT fry	WCT >1+	BRK
Duck Creek	ungrazed	28.4(±8.2)	3.3(±.2)	6.0(±.2)
	grazed	12.8(±2.8)	3.9(±1.0)	10.0(±.4)
Timber Creek	grazed	2.7(±1.3)	2.3(±0)	31.1(±3.2)

ACKNOWLEDGEMENTS

Biological aides Robert Warren, Kelly McLeod and Christopher Wright made significant contributions in data collections and summarization. Conservation Officers Lynn Merrill, Dan Duggan, John Hanson, Joe Curry and Brent Ritchie participated in field work. Bureau of Land Management employees Tim Bozorth, Mike McQueen and Bob Jones also assisted in data collection. State Resident Fisheries Manager Al Van Vooren helped out with electrofishing on the South Fork.

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Appendix 1. Copy of the questionnaire used for the 1987 angler survey on the South Fork of the Snake River.

SOUTH FORK SNAKE RIVER QUESTIONNAIRE

If you have already filled out a South Fork questionnaire in 1987, please check the box and answer only Part III. /___/

PART I

1. What county (residents) or state (nonresidents) do you live in? _____

2. How many years have you fished the South Fork? _____

3. Approximately how many days/year do you fish the South Fork? _____

4. In the last three years, what percentage of your fishing trips occur on the:

   Palisades Dam to Irwin Section? ____% (Early Season, General Regs)
   Irwin to Heise Section? _____% (General Season, Special Regs)
   Heise to Menan Section? _____% (Year-Round Season, General Regs)

5. Which type of tackle do you prefer to fish? Bait ___ Lures ___ Flies ___

6. Are you aware of the special regulations on cutthroat trout fishing in the Irwin to Heise section? Yes _____ No _____

7. Since special regulations were placed on the South Fork cutthroat fishery from Irwin to Heise in 1984, would you say that fishing has:

   Improved _____ Declined _____ Stayed Same _____ No Opinion _____

PART II

8. Would you be in favor of managing the South Fork from Palisades Dam to Irwin under the same regulations and season that are in effect on the Irwin to Heise section? Yes _____ No _____ No Opinion _____

9. If the season and regulations on the Palisades Dam to Irwin section were changed to match those on the Irwin to Heise section, would you continue to fish the Palisades Dam to Irwin section? Yes ____ No ____ No Opinion ___

PART III

1. What section(s) of the river did you fish today? Date ____/____/____

    1. Palisades Dam to Irwin _____
    2. Irwin to Heise _____
    3. Heise to Menan _____

2. How many hours did you fish today? _____

3. Are you through fishing for the day? Yes _____ No _____

4. What type of gear did you use? Bait _____ Lures _____ Flies _____

5. How many of the following species did you:

	Keep?	Release?
Cutthroat	_____	_____
Brown trout	_____	_____
Lake trout	_____	_____
Rainbow	_____	_____
Whitefish	_____	_____

JOB PERFORMANCE REPORT

State of: Idaho

Name: REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-12

Job. No.: 6 (IF)-c[2]

Title: Region 6 (Idaho Falls) Lakes and Reservoirs Investigations

Period Covered: July 1, 1987 to June 30, 1988

ABSTRACT*

*A complete report of the Desert Drainages Survey is available under separate cover from Idaho Department of Fish and Game, P.O. Box 25, Boise, Idaho 83707.

JOB PERFORMANCE REPORT

State of: Idaho **Name:** REGIONAL FISHERY MANAGEMENT INVESTIGATIONS

Project No.: F-71-R-12

Job. No.: 6 (IF)-d **Title:** Region 6 (Idaho Falls) Technical Guidelines

Period Covered: July 1, 1987 to June 30, 1988

ABSTRACT

Technical assistance was provided to federal, state and local agencies upon request. Three fish kills were investigated in 1987.

Authors:

Steven Elle
Regional Fisheries Manager

Chip Corsi
Regional Fisheries Biologist

OBJECTIVES

1. To assist the Department of Water Resources and Corps of Engineers in evaluating the effects of habitat alteration on fish populations.

2. To recommend procedures that minimize adverse effects of stream and lake alterations.

3. To provide information on fisheries and aquatic habitat and to assist with habitat restoration efforts.

TECHNIQUES USED

We responded to all requests for data, expertise and recommendations from individuals, government agencies and corporations. Meetings were attended and field inspections conducted as necessary in order to formulate responses.

FINDINGS

During 1987, we responded to requests for technical assistance on water-related issues as follows:

Army Corps of Engineers	7
Bureau of Land Management	11
Bureau of Reclamation	10
U.S. Fish and Wildlife Service	7
U.S. Forest Service	12
U.S. Soil Conservation Service	2
Federal Energy Regulator Commission	20
Northwest Power Planning Council	2
Idaho Department of Health and Welfare -- Division of Environment	4
Idaho Department of Lands	5
Idaho Department of Transportation	3
Idaho Department of Water Resources	12
Idaho Outfitters and Guides Board	1
Idaho State University	1
Washington Department of Game	1
Bonneville County	2
Fremont County	1
Madison County	1
Private Fish Pond Permits	7

Many of the requests required several days to review and provide comments. In particular, small hydro projects required multiple days of time by one or more staff members to review either proposals or project operations.

Several fish kills were reports in *1987.* Two were reported in irrigation systems and were believed related to demossing activities. We were unable to document kills below the waste water returns of the canals in public waters.

A prolonged fish kill was reported in the Teton Canal at the Briggs Hydropower Project in May and June. The trout and whitefish which died were mature fish and may have been postspawning mortalities. Specimens collected by the project operator were not preserved well enough to allow lab analysis. No source of kill was found. We will review the situation in 1988 to determine if the problem still exists.

Submitted by:

Chip Corsi
Regional Fisheries Biologist

Steve Elle
Regional Fisheries Manager

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

Steven M. Huffaker, Chief
Bureau of Fisheries

Al Van Vooren
Resident Fisheries Manager